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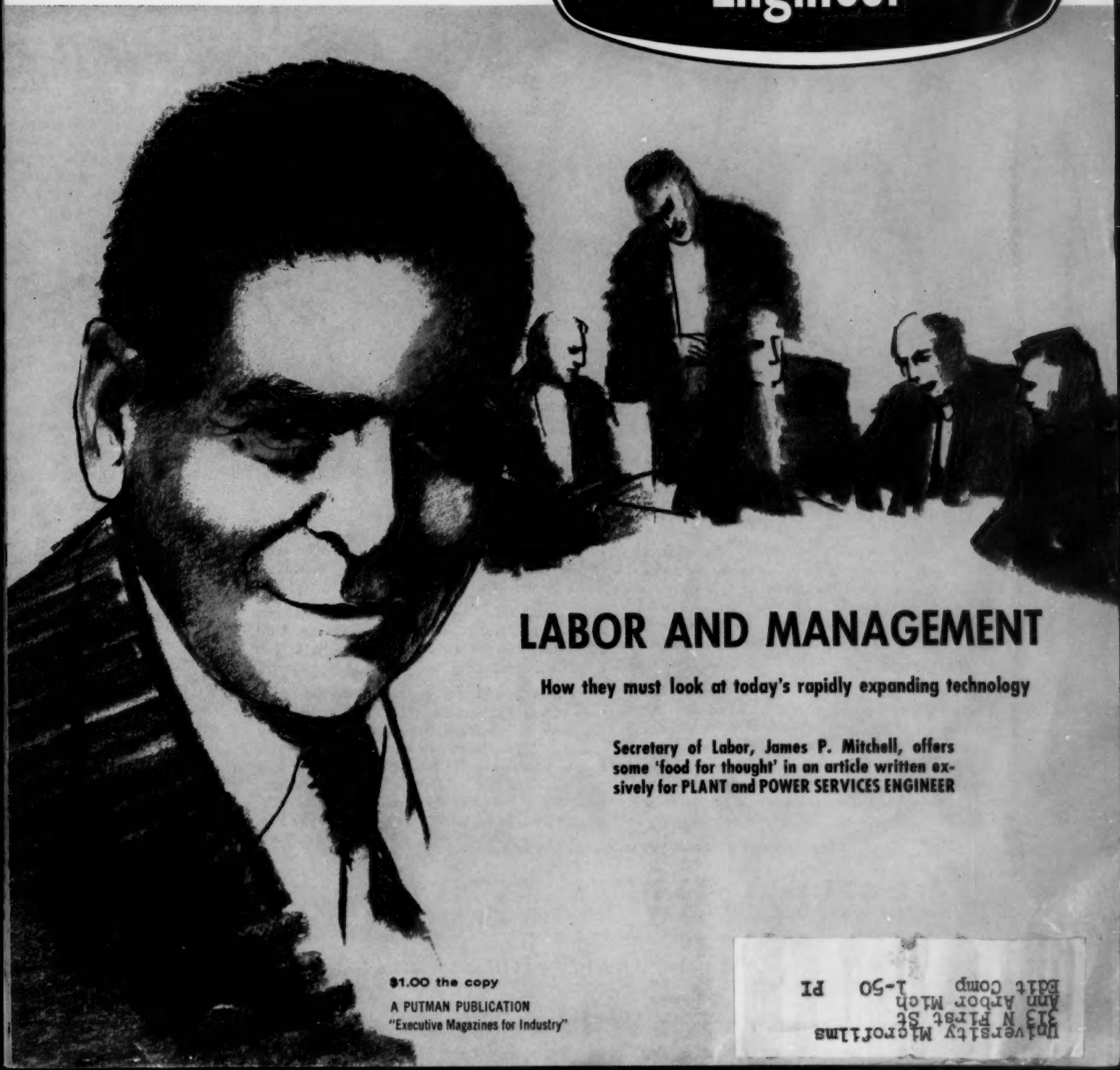

LABOR AND MANAGEMENT

How they must look at today's rapidly expanding technology

Secretary of Labor, James P. Mitchell, offers some 'food for thought' in an article written exsively for PLANT and POWER SERVICES ENGINEER

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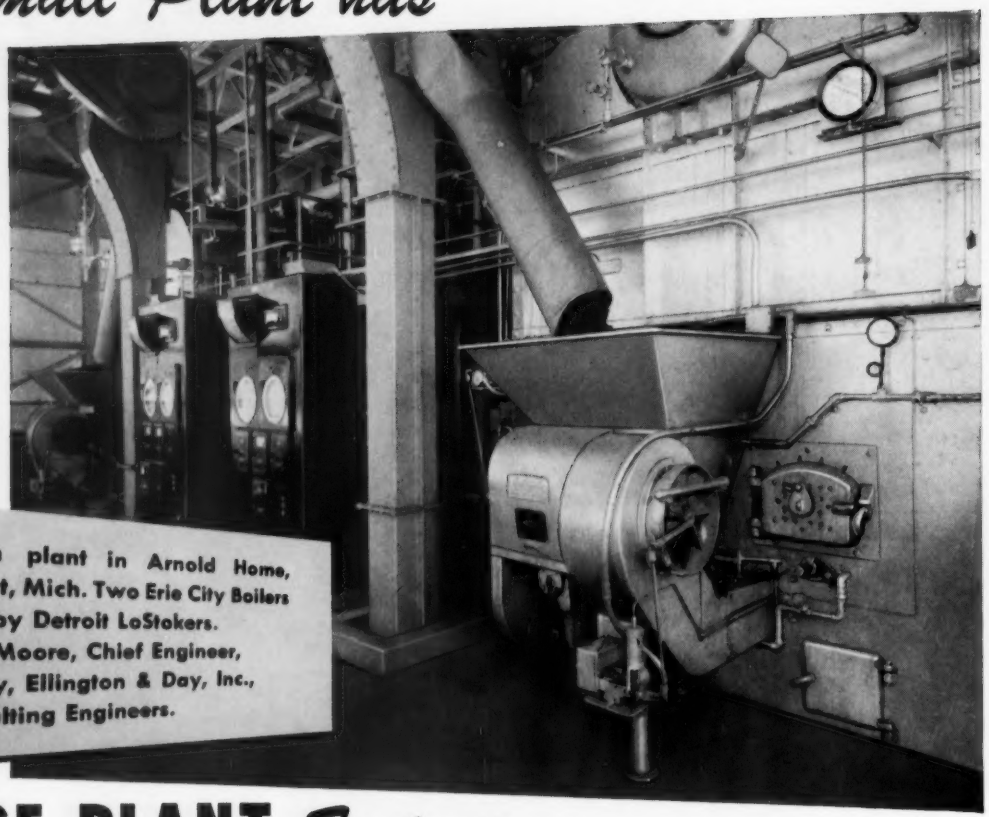

Steam plant in Arnold Home, Detroit, Mich. Two Erie City Boilers fired by Detroit LoStokers. C. E. Moore, Chief Engineer, Harley, Ellington & Day, Inc., Consulting Engineers.

LARGE PLANT *Features . . .*

ONE DETROIT LoStoker DOES WORK DESIGNED FOR TWO

When the Arnold Home in Detroit was enlarged from 285 to 401 beds, a complete new steam plant was built. Two water tube boilers each of 9,000 pounds of steam per hour capacity were equipped with Detroit LoStokers. This was to furnish steam for a large laundry, the kitchens, water heating and all of the space heating.

It was expected that both boilers would be needed to carry the load in colder weather, especially after two more buildings with a total of 63 additional beds were added. However only one boiler was needed throughout one of the coldest winters on record in Detroit. One boiler was always on standby, ready for emergencies, extremely important in a home sheltering old and chronically ill people.

Either of the Detroit LoStokers easily met the firing requirements, including the rapid load fluctuations that occur when the laundry is in operation.

Stokers and boilers have full automatic control and complete instrumentation. Stoker hoppers are filled with coal by bucket elevators. Ash is dropped into a pit below the firing floor for periodic removal.

The Detroit LoStoker is a complete mechanical firing unit—ram type underfeed. It is efficient, dependable and built for long life. Requiring little power for operation it may be driven either by electric motor or steam turbine, under automatic control. Capacity range is 3,000 to 12,000 pounds of steam per hour. It is one of a complete line of Detroit stokers for boiler capacities up to 400,000 pounds of steam per hour.

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THAT'S INTERESTING

For "Whodunits"

The least understood of all physical phenomena, "what happens to produce an electric spark," was reported at the American Physical Society's opening meeting at the University of Texas.

Using an "electric eye" and ultra-fast electrical measuring instruments, the researchers found that the spark is produced by a series of electrically-charged waves, which sweep rapidly back and forth to build up a channel to carry the current.

This research is also important to certain astrophysical problems and will give a better insight into mechanisms of the upper atmosphere.

Face-lifting for meters

Meters are being reconditioned with the use of ultrasonic cleaning equipment consisting of a generator and tank transducer.

Racked for easy handling, the meter parts are lowered into cleaning tank, where ultrasonic energy scrubs off the soils. After first wash in detergent, parts are ultrasonically neutralized, finally soaked in trichlorethylene to speed drying.

Meters need be only partially disassembled. Millions of tiny "scrub brushes," created by the action of sound waves on the liquid, reach into blind holes. A time watch switches on the power to warm up the generator 15 minutes before starting time and turns it off at the end of the day's run.

Manufactured by Branson Ultrasonic Corporation, 40 Brown House Road, Stamford, Conn., the product also cleans totalizing relay parts, watches, and instrument frames.

Sept. 6-16: Production Engineering Show; Navy Pier, Chicago, Ill.

Sept. 6-16: Machine Tool Exposition; International Amphitheatre, Chicago, Ill.

Sept. 7-11: Annual National Conference of Illuminating Engineering Society; Fairmont and Mark Hopkins Hotel, San Francisco, Calif.

Sept. 20-25: 14th Annual Conference and Exhibit of the Instrument Society of America; Chicago, Ill.

Sept. 27-29: 1959 National Power Conference; Hotel Muehlebach, Kansas City, Mo.

Sept. 28-Oct. 1: American Welding Society Fall Meeting; Sheraton-Cadillac Hotel, Detroit, Mich.

Oct. 5-8: Northeast Regional NACE meeting; Baltimore, Md.

Oct. 6-9: Stanford Research Institute International Symposium; Asilomar, Monterey Peninsula, Calif.

Oct. 7-9: ASME-AIME Solids Fuels Conference; Cincinnati, Ohio.

Oct. 12-14: 1959 National Electronics Conference; Hotel Sherman, Chicago, Ill.

Oct. 12-15: South Central Regional NACE meeting; Denver, Colo.

Oct. 22-23: 15th Annual National Conference on Industrial Hydraulics; Hotel Sherman, Chicago, Ill.

Oct. 29-30: 1959 Electronic Devices Meeting; Shoreham Hotel, Washington, D.C.

Nov. 2-5: 11th Annual Exposition of Air-Conditioning and Refrigeration Industry; Convention Hall, Atlantic City, N.J.

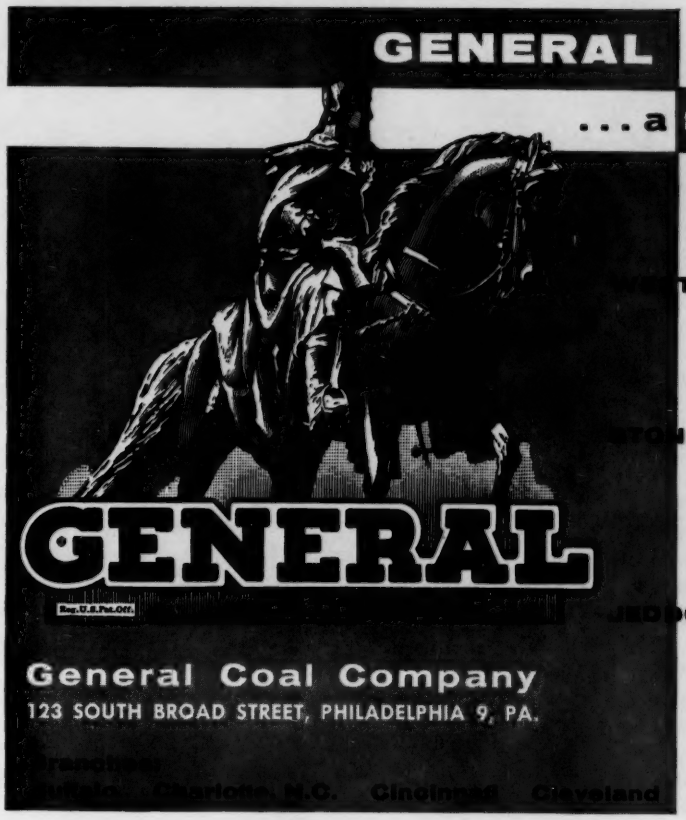
Nov. 2-5: National Metal Exposition; Morrison Hotel, Chicago

Nov. 5-6: Eight Annual Instrumentation Conference, Louisiana Polytechnic Institute, Ruston, La.

Nov. 9-13: National Electrical Manufacturers Association Annual meeting; Traymore Hotel, Atlantic City, N.J.

Nov. 23-24: Instrument Society of America Symposium; Ben Franklin Hotel, Philadelphia

Nov. 29-Dec. 4: ASME Annual Meeting; Chalfonte Haddon Hall, Atlantic City, N.J.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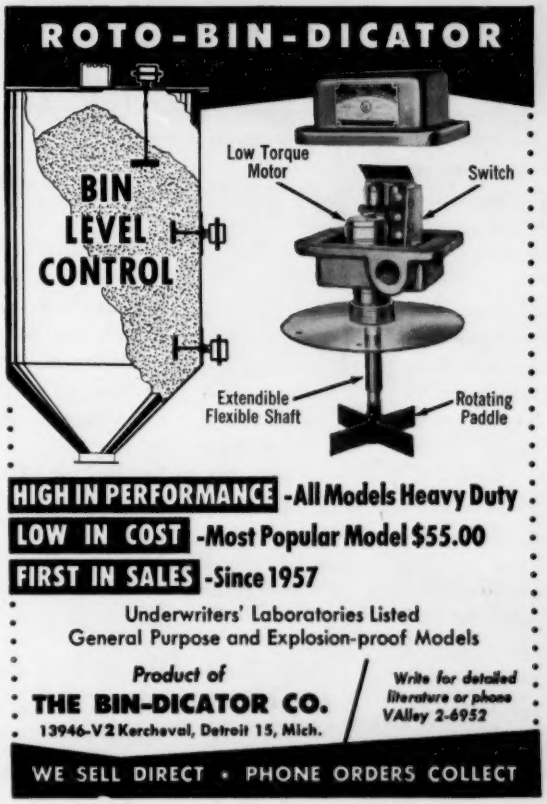
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Specifically speaking about this issue

The steel and other strikes — which have headlined the news this past month — have again brought home the need for better understanding in Labor-Management relationships. This is especially true in today's rapidly expanding technology — where there is an opportunity for everyone to benefit from the fruits of science.

ON LABOR . . .

"Some people think that the benefits of productivity increases should be divided only between labor and management — but there is a third party, the consumer," states James P. Mitchell, Secretary of Labor, as he discusses the present labor situation in this month's cover story. In his article written exclusively for this magazine, Mr. Mitchell points out the power fields as the prime examples of the way technological gains should be handled so that everyone will benefit. His article starts on page 16.

Mechanical power transmission in wet atmospheres can account for numerous difficulties. Good performance is being obtained at Fraser Paper Ltd. with a drive consisting of a single, endless rubber belt with a series of parallel V-ribs molded lengthwise around the inside circumference. These belts — besides not being affected by the wet atmosphere — save space and have low maintenance costs. Story on page 13 tells how these belts combine best features of flat belts with those of V-belts, giving nearly three times the traction area of a flat belt of equal width. This increases the power of the belt and decreases wear.

. . . DRIVES . . .

You will be hearing more of geothermal power in the next few years, especially since work is being carried on in this country to develop geothermic power plants.

Geothermal power is the use of underground steam for the generation of electricity and consists of tapping and developing underground wells for an almost unlimited supply of steam. A geothermic power plant would cost 30 to 40 percent less than present-day steam-electric plants.

Managing editor, George Michael, brings you up to date in his report on the development of geothermal power here and abroad. The work in this country is going on in California where Magma Power Company has an agreement with Pacific Gas and Electric to furnish steam to a 12,500 kw turbine-generator. Additional generators will be built as the first installation meets expectations and as steam wells are produced. This PLANT and POWER SERVICES ENGINEER report starts on page 18 and contains photographs of such plants in Italy and New Zealand.

. . . GEYSERS . . .

Sometimes, to bring you all there is to know about an important development takes a lot of editorial following over a long period of time. Such is the case with the industrial heat pump story starting on page 20.

. . . HEAT PUMP

Your editors have been following this, one of the most important heat pump stories, for over a year. At the time of its installation last year at Sylvania's Amherst Engineering Laboratory near Buffalo, N.Y., the installation was hailed as the northernmost heat pump designed for both summer cooling and winter heating of an industrial location without the use of supplementary heating system of any kind.

Now that it has had an opportunity to operate through one of the most severe winters and contrastingly hot, humid summers that area has had, the full story of its performance can be told. After reading this story, you will understand why this "show case" installation has attracted numerous engineers.

W. A. Cuntzman

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(as Plant and Power Services Engineer)

Plant and Power Services Engineer

Serving the key engineers and consultants who are responsible for both plant services and power services throughout all industry, in utilities and large public service installations.

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14 Eliminates rust problems through controlled environments
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REPORTS IN BRIEF

Will use atomic power in sea water conversion

Government announces West Coast project, also selection of other sites and processes in program

Atomic energy will power a proposed California plant to convert Pacific ocean water to fresh water, according to an announcement by Secretary of the Interior, Fred A. Seaton.

As part of the accelerating sea water conversion program reported in the June issue of PLANT and POWER SERVICES ENGINEER (page 18) the government also has announced selection of other conversion plant sites and processes.

The first of the five demonstration plants, using a long-tube vertical multiple-effect distillation process, will be built at Freeport, Texas, two miles from the Gulf Coast. Capacity of the plant will be one million gallons of fresh water a day.

The Interior Department has also announced selection of an electrodialysis process for the third of five authorized saline water conversion demonstration plants.

The plant will be designed to convert brackish water to fresh at an anticipated rate of at least 250,000 gallons per day. It will be located in the northern great plains or in the arid areas of the southwest.

Describing the operation of the third process, Dr. A. L. Miller, Director of the Office of Saline Water, said: "An electrodialysis process uses a combination of electrical current with special types of membranes to remove salts from water."

Several plants utilizing electrodialysis, with conversion capacities ranging up to 86,400 gallons per day, are in commercial operation. A 3-million gallon-per-day plant is under construction in South Africa. Operating data from these plants together with information obtained from pilot plant tests and fundamental research continue to develop improvements in the electrodialysis processes.

✦ ✦ ✦

Publish AEC hearings on civilian atomic power

A report of the hearings held in February before the Joint Congressional Committee on Atomic Energy have been printed and are now available.

The hearings report contains testimony by AEC representatives on the major aspects of the commission's programs, as well as testimony by representatives of industry and other interested groups and individuals. The major focus of this year's hearings was on the civilian atomic power program and policies.

Other subjects covered included isotope development, AEC contract policies, maritime propulsion program, and the declassification and dissemination of information by the AEC.

Of particular interest is a summary prepared by the AEC at the request of the Joint Committee on the status of the power reactor program. This summary includes reactor construction costs, construction schedules, and reactor operation information.

In addition to providing background information on each of the projects considered or proposed for authorization, the hearings record contains comprehensive summaries of major projects con-

ducted during the past year and new projects proposed for further development. The four power reactor design studies performed by the AEC, in accordance with the requirements of last year's authorization legislation, are discussed in detail. Technical aspects of the designs are described and cost estimates tabulated for comparison.

Aspects of the high temperature gas-cooled reactor project proposed by Philadelphia Electric and General Dynamics are included. Testimony concerning proposed methods of capital grants for reactor construction along with analyses of the various methods are also included.

We Are Quoted

Page 401 of the report contains quotations from the article by Dr. Robert E. Wilson that was featured in our January issue. The quotation is included in the statement submitted by Tom Pickett, executive vice-president of the National Coal Association.

Utility meters cleaned ultrasonically

Important economies in public utility and industrial cleaning jobs are being made through the use of ultrasonic methods in reconditioning delicate meters and timing devices, according to Paul M. Platzman, executive vice-president of Narda Ultrasonics Corporation, Westbury, New York.

With the ultrasonic method, there is said to be no need to tear down the mechanism, nor does the work require special skill. The complete assembly is submerged in the ultrasonic cleaning tank and thoroughly cleaned "as is." Shafts, gears, bearings and other parts require no special brushing or hand work.

For meter cleaning, electronic generators and barium titanate transducers are said to be the most efficient, and comprise about 95 percent of all present industrial installations.

Mr. Platzman described a three-step meter-cleaning operation used by one major utility. First, registers found outside test limits are removed from the meters immediately and prepared for ultrasonic cleaning, with the removal of certain parts, including the motor and multiplier plate. This takes one to four minutes, depending on type.

The registers are then spun in a no-foam solution for two minutes, to remove all surface dirt, oil and metal particles. After this, the units are airspun to remove loose dirt and cleaning solution.

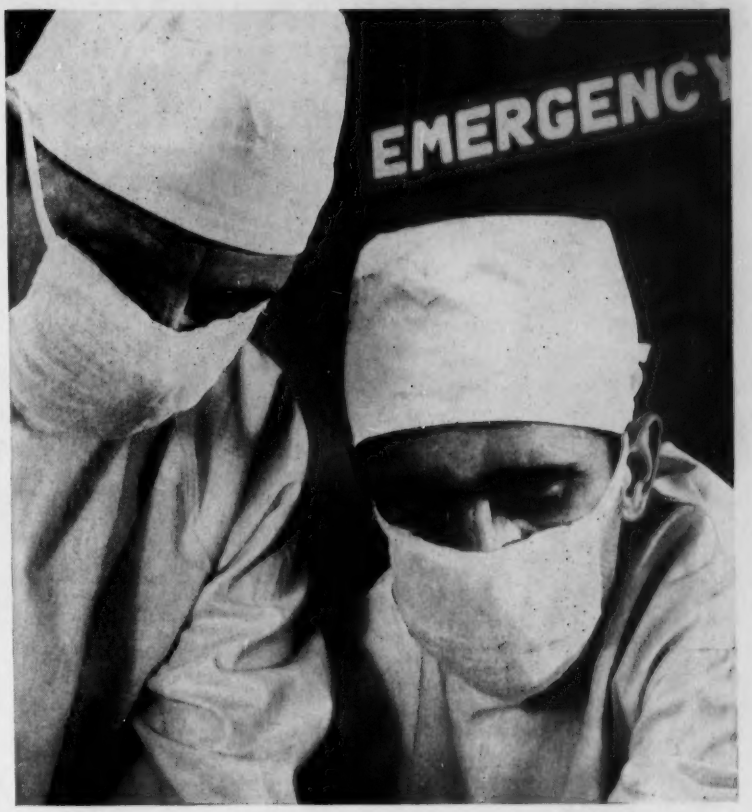
In the second step, registers are spun for 30 seconds in a container of solvent previously used for a final ultrasonic step. Another air spin removes the solution, oil, and remaining surface dirt.

In the final step, the register is placed in the ultrasonic tank with a solution of trichlorethane for about 30 seconds. This removes all traces of oil and dirt. No further rinse is needed. Registers, dry in a few seconds, can be calibrated immediately, the original friction limits restored.

All Alcoa conduit to be handled by Rome Cable

Aluminum Company of America has announced that responsibility for sales of all its aluminum conduit now is being transferred to Rome Cable Corporation, which recently became an Alcoa subsidiary.

Addition of the Alcoa line to that of Rome Cable will make available to the electrical industry a full line of aluminum and copper conductors and accessories and aluminum and steel conduit from a single nationally know supplier.



Where else in this hospital is standby power important?

Any list of critical areas or services would include elevators, heating system, respirators, aspirators, oxygen tents, communications, x-ray equipment and various kinds of pumps. Interruption of electric power to any of these could be as vital to the patient as failure of emergency or operating room lighting.

Onan can supply individual emergency electric plants up to 230,000 watts *to handle all essential hospital services.* A wide choice of voltages is available to meet the different voltage requirements of electrical equipment.

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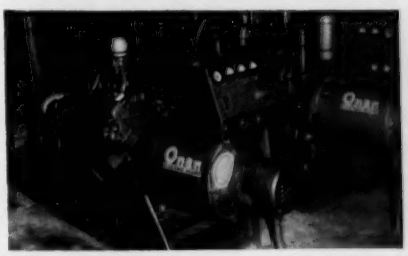

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REPORTS IN BRIEF

Progress report on heat storage

A method for improving the annual load factor of heat pumps and resistance heating systems offers considerable promise in reducing electric peaks of the heating load by means of heat storage on customers' premises.

The first phase of a heat storage research project has now been completed by Battelle Memorial Institute and Comstock and Wescott, Inc., and reports have been submitted to the Joint AEIC-EEI Heat Pump Committee.

Their findings indicate clearly that there is no ready-made solution. The safe, small volume heat storage apparatus requiring only "design engineering" was not discovered. Both reports indicate that only through considerable research and development work can the desired objective be attained.

According to Battelle's report, high-temperature storage, charged with resistance heating properly controlled, offers the most immediate promise as a means of smoothing load curves with either heat pump or other electric heating systems.

Comstock and Wescott's report recommends that future research and development work which might be expected to yield a practical method of heat storage be directed to the simultaneous study of three classes of systems, heat of hydration, heat of fusion, and heat of chemical change.

Since the heat storage systems of greatest interest involve relatively high temperatures for either short or long periods of time, C and W believe that research is needed in the field of insulation to reduce heat loss from the storage systems without the need for a large volume of insulation material as would be the case with the best known insulators of today.

This consultant recommends undertaking a program of research in the insulation field, particularly in the area of vacuum insulation.

A limited number of copies of the reports by Battelle Memorial Institute and by Comstock and Wescott, Inc., are available from the New York office of Edison Electric Institute.

Fluorescent lamps give "end-to-end" light

A 40-watt fluorescent lamp which lights all the way to the electrical contact pins has been announced by Westinghouse Lamp Division. Because of a new translucent plastic material which replaces the ordinary opaque metal or plastic base, even the bases on the end of the lamp provide illumination.

Other improvements in the line of lamps include change in the gas pressure inside the fluorescent tube, a more efficient cathode, greatly increased uniformity of phosphor particle size, and an improved gas mixture. As a result, the lamps are said to provide a 21 percent increase in light output over fluorescent tubes presently in use.

Others urge depreciation, tax policies revision

In a feature article (page 16) in the July issue of PLANT and POWER SERVICES ENGINEER, Mr. James P. Stewart, president, De Laval Steam Turbine Co., warned of stifled economic growth from our present unrealistic depreciation practices. Now two other leaders in business have echoed Mr. Stewart's warning and his pleas for revision.

Speaking before the recent international accounting conference, Mr. Paul Grady, partner in Price, Waterhouse & Co., said, "If we continue to ignore economic depreciation in income, taxation and in accounting, it is my view that we will jeopardize the needed modernization of productive facilities, the essential arsenal in the economic battle with the communists."

Mr. Grady further stated that the loss in purchasing power of the dollar affects all

assets — cash, receivables, inventories and plant facilities — to the extent that the investment in such assets is not hedged by dollar obligations.

He explained that losses apply to personal ownership as well as to corporate ownership: "Some argue that since it is impossible to restore the losses due to inflation to everyone, it is unfair to give recognition to economic depreciation on productive facilities." Grady added that this viewpoint fails to consider the serious impact of such a policy upon the future productivity of the economy.

Addressing a summer management conference sponsored by the University of Michigan, Michigan State University and Wayne State University, Ralph E. Cross, executive vice-president, The Cross Co., Detroit, declared: "Capital recovery (of funds spent for improved plant and equipment) in the U. S. is the slowest of any industrial country in the world. It takes from 12 to 30 years to recover funds invested in machine tools in the U. S., as opposed to four to eight years in the industrial countries of Europe."

Cross listed four ways to further technological advances in the U. S.: continued expansion of research (now a $10 billion annual industry), revised tax policies on depreciation of industrial plant and equipment, increased productivity, and stepped up incentives for individual success.

Launch Project EHV

Construction of Project EHV, GE's $7½ million transmission line to carry power up to 750 kv, was officially launched May 27 with a ground breaking ceremony near Pittsfield, Mass.

To be built this year are an all-aluminum substation with an autotransformer and other equipment rated 750 kv maximum, an administration building, and a section of the line 0.6 miles long.

Three portal towers 180 feet wide and up to 160 feet high will be energized for tests in the 400- to 550-kv range next spring.

While open-end tests are under way on the short, portal-tower section, the rest of the line will be built in 1960. It will be 3.6 miles long and employ 15 towers of conventional design, making a total length of 4½ miles.

In 1961 the second substation will be built and terminal equipment installed to tie into the Western Massachusetts Electric Company's transmission system to carry useful amounts of power. Voltages will be raised in steps to the 650-kv level (750-kv maximum).

Aluminum jacketing goes pastel

Aluminum jacketing with a factory-baked enamel color finish has been used over insulation on practically all process vessels and pipe lines in The Superior Oil Company's new Lowry gas processing plant near Lake Arthur, La.

This is believed to be the first industrial use of a pre-finished colored aluminum as insulation jacketing. Some 25,000 pounds of Reynolds "Colorweld" aluminum, in .016 and .024-inch gauge, were used on the Superior job. All painting of insulated process pipes and vessels on the site was eliminated.

As the Lowry plant is of the refrigerated absorption type, insulation was required on practically every vessel and pipe line. While colored process equipment is being used increasingly by refineries for its eye appeal, the enameled aluminum was specified for operational reasons as well. The aluminum is coated on both sides in the manufacturing process with a durable enamel. This increases the protection to the jacketing, but even if mechanical damage ever occurs, aluminum resists most types of corrosion.

In the Superior plant four of the pre-finished colors were used — pastel beige, pastel pink, pastel blue and vivid creme.

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Circle 9404 inside back cover.

Keep pace with your space . . .

CYCLOTHERM

provides for

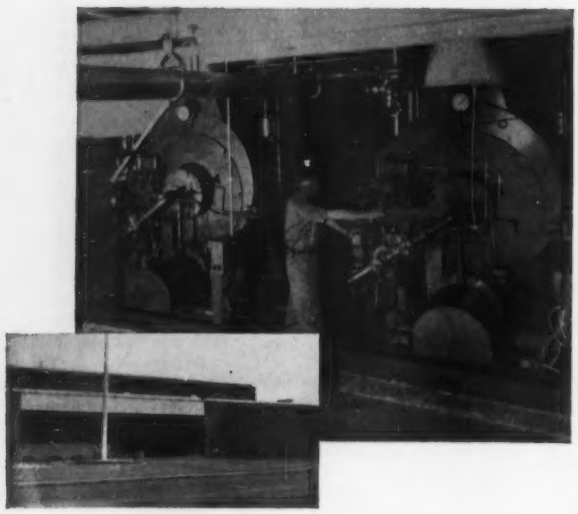
tomorrow's heating today

The Cyclotherm you install today will meet your steam requirements for many years to come. But time does fly and businesses do grow. And when you make a plant addition 18 Cyclotherm models, with 18 different boiler horsepowers, are ready to match new space with new heating capacity.

The Cyclotherm Steam and Hot Water Generator is built under one roof with one manufacturing responsibility backing the entire equipment—shipped fire-tested and ready to operate. Up to ⅓ smaller than other package generators of same capacities and needing no excavation, no foundation, no costly stack.

Electronic controls operate the Cyclotherm automatically. On units of 80 HP or more, modulation controls regulate firing rate from 30% to 100% of rated capacity without loss of efficiency. Smaller models automatically *off* when steam demands are satisfied, automatically *on* when more steam is needed. Operation stops if firing sequence is interrupted and unit fails safe. Cyclotherm cuts maintenance costs by up to 50%.

Cyclotherm meets all state requirements, conforms to A.S.M.E. and National Board standards, carries Underwriters' Laboratories label. Burns oil and/or gas. Steam generators: 15 to 750 HP. Hot water Generators: 670,000 to 6,700,000 BTU per hr.



At the Frederick Leighton School, Oswego, N. Y., two 100 HP Cyclotherms keep 21 classrooms and 550 pupils warm and comfortable. Building designed by Ketcham-Miller-Arnold Architects of Syracuse, N. Y.; Consulting Engineer Cedric R. Acheson, also of Syracuse.

YEARS AHEAD IN STEAM & HOT WATER GENERATION

CYCLOTHERM® Steam & Hot Water Generators

Division of National-U.S. Radiator Corp.
65 E. First St., Oswego, N. Y.

Clip to Your Letterhead:

65
Please send me full information about Cyclotherm Steam and Hot Water Generators.

Circle 9405 inside back cover.

REPORTS IN BRIEF

Southern Cal Edison to get automated units

The world's most advanced computer-automated steam-electric power generating units are scheduled to be completed by Southern California Edison Company late in 1960 at its Huntington Beach generating station.

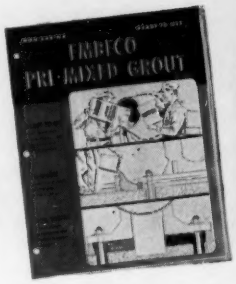
Two new cross-compound steam turbine-generator units — Numbers 3 and 4 — will be added to the existing facility, boosting overall capacity to 820,000 kw. The computer-controlled boiler-turbine-generator systems will be automated by GE which is also supplying one of the two new generating units. The GE generator will be rated 210,000 kw.

GE's advanced computer control system will provide data logging and alarm functions, make continuous performance calculations, and maintain constant control over the two units. The utility expects the automatic control system to provide increased operating safety and reliability, improved continuity of service, and reductions in fuel, operating, and maintenance costs.

Philly Electric to build all-aluminum tower line

Though the most recent to announce its project, Philadelphia Electric may well become the first utility to complete an all-aluminum tower high-voltage transmission line. Delivery of its first tower was expected this summer, and plans call for putting the completed line into service by mid-1960.

Towers for the Philadelphia Electric project, like those previously announced for Public Service Electric and Gas of N.J. and Commonwealth Edison, are being designed and fabricated by Alcoa. The Philadelphia Electric program is unique among the three in that it is considered by the utility to be a "normal" working line project, with no element of experimental investigation involved.



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Division of American-Marietta Co.

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*EMBECO is the registered trademark of The Master Builders Co. for its specially prepared, flowable non-shrink grout.

Circle 9406 inside back cover.

SIGNAL HORN

These are only 3 of 18 possible installation variations.

The basic horn (illustrated), with the addition of modular accessories also provides for flush installation, single or dual projector models, for surface mounting outdoors and for surface, semi-flush or concealed conduit installation indoors. The horn is self tuning, capable of withstanding continuous duty and may be adjusted for volume.

This horn can cover the majority of your signalling requirements. Ask for the FEDERAL Bulletin on the Vibratone.

FEDERAL SIGN and SIGNAL Corporation 13609 S. Western Ave., Blue Island, Illinois

Circle 9407 inside back cover.

NON-FLUID OIL

TRADE MARK REGISTERED

KEEPS COSTLY EQUIPMENT OPERATING

To reduce down-time of costly equipment —change to NON-FLUID OIL. It protects highly finished ball and roller bearings from failure due to acids in most greases. NON-FLUID OIL provides a constant film and perfect lubricating seal to exclude dirt and moisture. It gives added life for anti-friction bearings because it "stays alive longer" than ordinary greases, lubricating effectively until entirely consumed.

Used or approved by most bearing manufacturers, NON-FLUID OIL is available in specific grades for every type of equipment. Write now for free, on-the-job testing sample and Bulletin No. 506.

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Also represented in principal industrial centers, including Pittsburgh, Pa., Cleveland and Cincinnati, Ohio.

NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture. So-called grease imitations of NON-FLUID OIL often prove dangerous and costly.

Circle 9408 inside back cover.

The new line will use in excess of 20 aluminum towers to carry a double-circuit 220-kv transmission line. It will link Philadelphia Electric's Chichester substation with its new Delaware River crossing at Chester, a distance of over three miles.

Philadelphia Electric has been a pioneer in the use of aluminum structures. With 29 substations in the system employing aluminum buses — seven of these utilizing structural aluminum for bus and equipment supports — the utility has accumulated comprehensive engineering and performance data on the light metal.

Waste treatment method that fish like

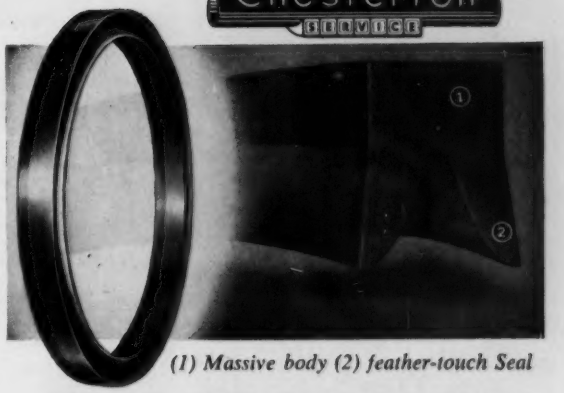
Fish not only swim, but thrive in an aquarium filled with treated waste water at a Cities Service Oil Company refinery near Toronto, Canada. The water that remains in the 20-foot diameter aquarium is odorless, colorless, and tasteless.

A plastic packing material used in a biological oxidation tower system similar to a conventional trickling filter is the key to the waste treatment. The packing, a product of the Dow Chemical Company, known as "Dowpac" is said to be light weight, has excellent aeration of waste water, large surface area for development of bacterial slimes, and freedom from plugging and channeling.

Biological trickling filter borrows a trick from nature, where water is purified by certain bacteria that live on natural pollution. A man-made filter tower packed with Dowpac provides bacterial slime with an ideal habitat.

There, given ample oxygen and ready contact with waste materials, these bacteria live on pollution and convert unwanted materials into carbon dioxide and water. The more area that can be utilized to hold bacterial slime in contact with trickling water, the more effective the oxidation action is.

PACKING Chesterton SERVICE



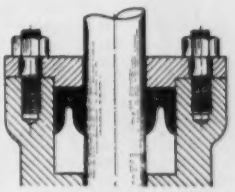
(1) Massive body (2) feather-touch Seal

MONOSEAL

a NEW trouble–free single Ring

HYDRAULIC PACKING

Chesterton MONOSEAL is a new improved hydraulic ram packing adaptable to all stuffing box depths using but one strong single ring. It retains maximum pressures. MONOSEAL gives ***exceptional service*** even under ***adverse conditions*** because of its unique flared lip design and heavy bodied massive construction. The MONOSEAL ring requires ***no adaptor — no reinforcement — no gland adjustment.*** It remains self-adjusting. Its massive design and tough construction withstands excessive press bumping which ruins life of leather U or V type packings. MONOSEAL's feather-touch lips will not weep assuring ***constant maximum operating pressure*** and positive seal whether at maximum pressure or at zero. Costly fluid losses are eliminated.



Cross sectional view.

Chesterton MONOSEAL is immune to water—oil —oil solvents. It will not swell or bind.

"The proof of the pudding is in the eating"—order a trial single Chesterton MONOSEAL ring for your equipment—today! Simply state diameter of ram, diameter and depth of box.

A. W. CHESTERTON CO.

America's Oldest Mfr. of Mechanical Packings

20 Ashland St., Everett 49, Mass.

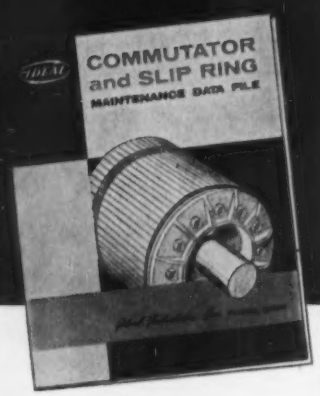
Circle 9409 inside back cover.

FREE

NEW SERIES

HOW-TO-DO-IT ARTICLES

on Commutator and Slip Ring Maintenance



Years of experience are packed into this new 6-article series — each an invaluable guide for keeping commutators and slip rings at peak performance.

Each article discusses a major part of the overall problem — gives practical tips on maintenance — tells how to solve common problems — what to do and how to do it — in easily read shop language. Supplied in attractive folder, forming complete maintenance data file.

Designed as useful refresher reading and trouble shooting guidance for the veteran maintenance man . . . and a must for the new man just "breaking in" . . . the entire series has been prepared in close consultation with leading, nation-wide engineering authorities.

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Circle 9410 inside back cover.

LETTERS

Your views are welcome in this column. Address "Letters, Plant and Power Services Engineer, 111 East Delaware Place, Chicago 11, Ill." Letters should be brief and confined to the editorial of this magazine or other topics of interest to the plant and power services functions.

Wants to quote us

As a part of its mission to assist the various Naval activities of the First Naval District to improve maintenance methods, the Maintenance Division of this office periodically publishes a paper called "Maintenance Notes." It usually includes among other things items regarding new maintenance materials and methods. A copy of a recent issue is enclosed for your inspection.

Your magazine "Plant and Power Services Engineer" frequently contains items which would be of interest to personnel of the Public Works Departments of the District activities we serve, and permission to quote from such articles would be greatly appreciated.

G. F. FERGUSON
Manager
Facilities Branch
Maintenance Div.
District Public Works Office
First Naval District

• *We have read with interest Reader Ferguson's paper "Maintenance Notes" and wish to congratulate him on a job well done in furnishing the District with maintenance tips. We will be very happy to have articles from "Plant and Power Services Engineer" quoted in the report.*

— The Editors

Torque scale goofed

In the July, 1959, issue of "Plant and Power Services Engineer", a "Torque Determination" nomograph appears on page 29, prepared by Mr. Klima of Oak Ridge National Labs.

This is a useful nomograph in obtaining the "lb-ft" torque values, but appears to be in error in the "oz-in" scale. There are 192 oz-in, in one lb-ft, rather than the 1.33 as indicated by the nomograph.

Apparently the author divided by 12 instead of multiplying by 12 to obtain the factor.

The usefulness would also be increased by extending the rpm scale to 3600 — a rather common motor speed — so that only the horsepower scale would have to be used in multiples of ten for range extension.

RALPH H. LEE
Sr. Development Engr.
Design Division
E. I. du Pont de Nemours & Co., Inc.

• *Many thanks to Reader Lee for catching the scale error in this nomograph. Other readers saving these nomographs should make a note on this particular one to multiply the oz-in scale reading by 144 to obtain the true value.*

—The Editors

Do you have nomographs?

I am enclosing two graphs for possible publication in your magazine.

I have used them in my work for checking quantities obtained through other formulas and have found them fairly accurate.

I am engaged as an engineer in design and contracting of mechanical services for buildings and power plants. I have accumulated some valuable information from the articles and graphs in your magazine.

HARRY L. BRYMAN
Brooklyn, N.Y.

• *We will be very happy to consider Reader Bryman's graphs for publication in "Plant and Power Services Engineer." We are always on the lookout for good nomographs which have aided our readers in their work.*

If you have such a nomograph — and it has not been published before — why not send it to the Data Editor. Each nomograph published will earn you $20.00.

— The Editors

WITHOUT HARM TO FORM OR FUNCTION

UNIBESTOS®

...WORLD'S FINEST PIPE INSULATION

What gives UNIBESTOS the strength and body to stand up under torturing punishment? It's the *only* pipe insulation made almost entirely of tough, long-fiber asbestos. It's *uniformly durable* — i.d. to o.d. — and this means remarkable stamina.

WORTH MORE MONEY

In passing a recent certification test at Ohio State University, a 3-section length of UNIBESTOS was boiled continuously for 72 hours, then subjected to a 24-hour period of drying. Results: no opening-up of longitudinal or butt joints; almost complete absence of fraying. It did not mush or fall away from pipe and, when dry, did not change in shape or physical characteristics. UNIBESTOS is easy to cut . . . clean to use . . . won't shrink or thermal shock!

For temperatures to 1200°F.—in single-layer thicknesses to 5" and sizes to 44" o.d.

Ask for Catalog F76-321 with exclusive "J" Factor Tables.

UNION ASBESTOS & RUBBER COMPANY
General Sales Offices, 1111 W. Perry Street, Bloomington, Illinois
Distributors in Principal Cities

Circle 9411 inside back cover.

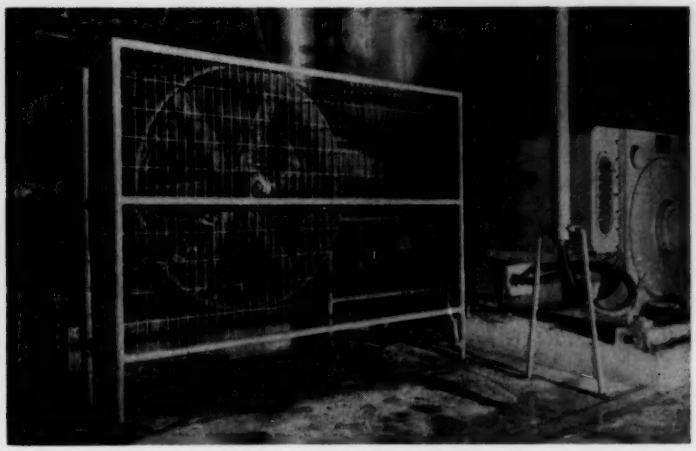
SEPTEMBER, 1959

VOL. 1 NO. 5

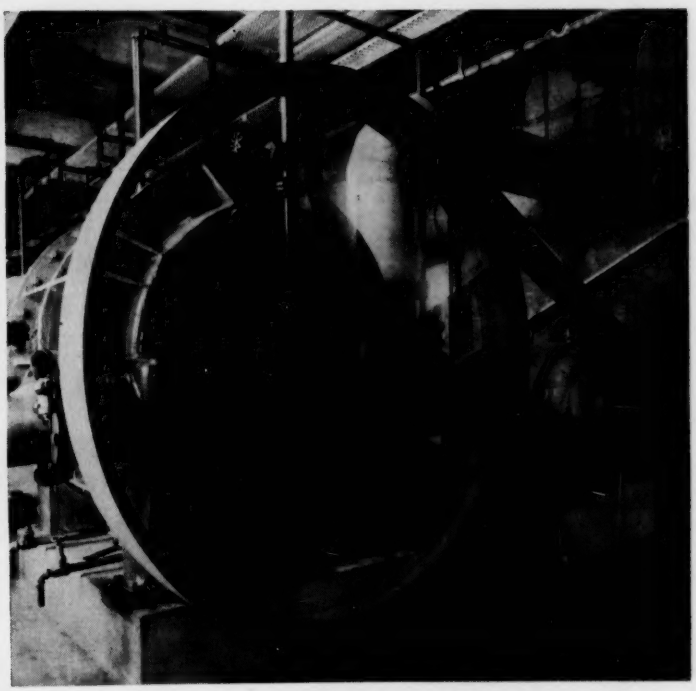
Plant Power Services Engineer

DRIVES withstand wet atmosphere, have low maintenance

Combining best features of flat belts with those of V-belts, drives used on vacuum pumps save space, keep maintenance costs low



This drive (No. 1 in table) has required little maintenance during five years service



This drive (No. 4 in accompanying table) was placed in service in 1958

GOOD performance is being obtained at Fraser Paper Limited, Madawaska, Me., with a drive consisting of a single, endless rubber belt with a series of parallel V-ribs molded lengthwise around the inside circumference.

Six of these belts, in the range of 150-200 hp, are used to drive Nash vacuum pumps from electric motors. Pumps remove water from the wet web of paper through the Fourdrinier wire and press felts.

Drives have not been affected by the wet atmosphere.

Drives are clean and quiet. Maintenance cost on them has been very low. One reason they have been installed in some locations is the minimum space they require.

They combine the best features of flat belts with those of V-belts. Simplicity, flexibility and strength of flat belts are joined with high-speed ratio, short center distances and positive tracking features of V-belts.

The V-ribs give the belt nearly three times the traction area of a flat belt of equal width. This increases the power of the belt and decreases wear.

Belt has an uninterrupted member of high-strength synthetic cords across width. It is a single unit, not a series of belts.

Load is evenly distributed over full width of sheave. Matching problems of multiple belts are eliminated.

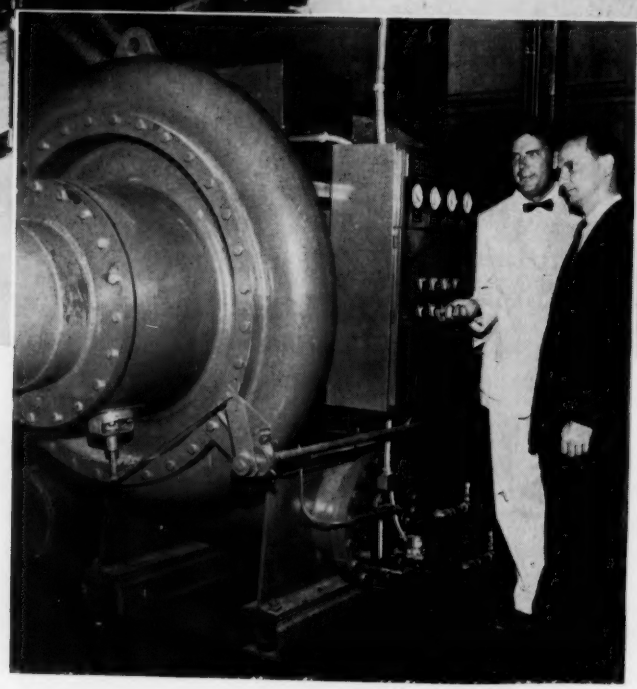
(Poly-V drive is a patented product of Manhattan Rubber Div., Raybestos-Manhattan, Inc., Dept. P&PSE, Passaic, N.J.)

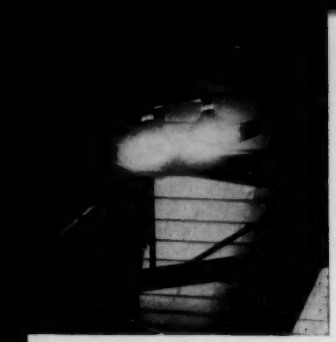
Circle 9412 inside back cover.

Resume of Drives in Service at Fraser Paper

	1	2	3	4	5	6
Pump Size (Nash Type)	H-11T	H-11	K-9	K-10A	H-11A	H-11A
Pump Speed	257 rpm	212 rpm	257 rpm	170 rpm	225 rpm	225 rpm
Pump Sheave	52.5" PD	63.5" PD	52.5" PD	84" PD	80" PD	80" PD
Motor hp	250	150	150	200	200	200
Motor Speed	900 rpm	900 rpm	900 rpm	900 rpm	900 rpm	900 rpm
Motor Sheave	15" PD	15" PD	15" PD	15.8" PD	20" PD	20" PD
Belt Width (M)	37 ribs	30 ribs	30 ribs	28 ribs	28 ribs	28 ribs
Belt Length	301" PL	271" PL	271" PL	361" PL	361" PL	361" PL
Brake hp	180	140	140	200	200	200
Year Installed	1954	1957	1958	1958	1958	1958

controlled environments





eliminate rust problems

Air handling units are mounted in the ceiling throughout factory area to distribute conditioned air by special louvered discharge nozzles to employee level on floor

Heart of air conditioning system is 600-ton hermetic centrifugal compressor which furnishes chilled water to air handling units in factory area

. . . If your plant has trouble keeping rust from forming on steel parts, you will be interested in the humidity control and air conditioning system Penco Metal Products installed in its factory and storage areas

In the past, Penco Metal Products Division manufacturing center at Oaks, Pa., was forced to paint its steel stock immediately after it was formed. Without the protective layer of paint, the stock would be coated with a film of rust within 24 hours.

Now, with the storage area controlled through air conditioning at 35 percent humidity, the raw steel parts can be stocked indefinitely, resulting in a marked saving through elimination of the extra coat of paint and the accompanying labor costs.

The use of pinpoint humidity control in one of the first completely air conditioned metalworking plants in the U. S. accounts for many other savings in such things as production control and worker turnover.

Penco, a wholly owned division of Alan Wood Steel Company, used to store finish-painted stock in one standard color. This meant that the turnover of that stock depended on demand for that one color. Otherwise, the company had to wait for the next manufacturing schedule and paint the order special.

It also meant that the stock could be easily spoiled by scratching the enamel in handling.

Penco can now manufacture quantities of fully fabricated stock parts according to demand without consideration for color demand. The plant can deliver the product in the color desired within 24 hours.

Principal component of the system is a 600-ton capacity hermetic centrifugal compressor which furnishes chilled water to room units in the office and to air handling units in the factory.

The manufacturing plant, a one-story rectangular structure, 700 by 180 ft, is divided into a high bay area with a 90-ft span 700 ft long, and a low bay area 90 ft wide by 700 ft with an 18-ft clearance.

The high bay area includes 9000 sq ft of steel receiving and storage, 45,000 sq ft of detail manufacturing, and 9000 sq ft of sub-assembly space.

The low bay area consists of 18,000 sq ft for parts storage dehumidified to prevent rusting, 22,500 sq ft power-ventilated finishing department, and 22,500 sq ft erection and shipping space.

In the manufacturing area, 13 large air handling units are spaced throughout the plant. Fresh air is brought to these units through goose necks on the roof, either warmed or cooled as desired, and distributed through ducts and diffusing outlets.

The average unit delivers approximately 23,000 cfm.

In the high crane bay area, the traveling crane dictated the minimum height for suspended air handling units. Here the units are mounted above the crane track. They are equipped with special louvered discharge nozzles which effectively distribute the conditioned air down to the employee level.

The same coil is used for chilled water in the cooling season and for hot water in the heating season. A thermostat in the discharge shuts off the outside air damper at a pre-determined minimum seting. Control of temperature is accomplished by a thermostat regulating a by-pass valve in the water line, plus a duct stat regulating the percentage of outside air used.

Management is convinced that the added inducement of air conditioning has helped reduce employee turnover as well as attracting an ample fully qualified skilled labor supply. In fact, the firm reports it had 700 applications for about 50 job openings at a time when skilled help was at a premium.

(More information on air conditioning system may be obtained from The Trane Company, Dept. P&PSE, La Crosse, Wisconsin.)

Circle 9413 inside back cover.

In the path of today's rapid technological growth . . .

Labor and Management Must Work Together

The Honorable JAMES P. MITCHELL
Secretary of Labor

"Power people have set the example — others must follow," warns Secretary of Labor Mitchell, as he discusses labor and management's position in today's highly technological industrial picture.

The philosophy under which power people work is that of giving the power user the full benefits of technological gains. And it is this philosophy that has given industry low cost energy for its increased productivity.

If we are all to benefit from this increased productivity, all phases of industry should adopt the same philosophy when it comes to settling labor-management disputes.

We think you will find much "food for thought" in this article by Secretary Mitchell, written exclusively for PLANT and POWER SERVICES ENGINEER.

When man took his burdens from his own back and transferred them to the backs of domesticated animals, he accomplished the first great revolution in the use of power.

He could carry much more that way, and restrict, perhaps, his use of energy to the flick of a switch and the occasional use of some choice words. Mule drivers have, I'm told, an extensive vocabulary, but it seems doubtful that very many of them employed the key term in describing their achievement, at least in discussion with their mules.

The word is "productivity" — and it is the key to understanding the impact of that first revolution in power, as it is the key to understanding the consequences of the second revolution in power, through which we are now passing.

It has been more than 6000 years since man's productivity was multiplied by the energy of his trained animals. For most of that time there was very little basic change in the sources of power, although water has turned millstones and ground grain for a long time.

Despite the use of water wheels, this power could not be transmitted more than a few feet, and power was still human or animal for most needs.

Then suddenly — thanks to men like Watt and Faraday and Einstein — to steam, coal and petroleum, electricity, and finally, nuclear energy — all of which in a space of two hundred years has multiplied man's capacity to operate machines and transport great weight, we are now seeing such an adjustment to new power resources as man had to make only once before in his long, long history.

This transferral of burdens from men to animals, and animals to machines can be shown statistically.

In 1850, before the steam turbine, gas and diesel engines, the U.S. could produce about 10 million horsepower, almost literally, since there were 7,747,000 horses at work according to one prevailing estimate.

Twenty years later, the worker still had available only 1.14 horsepower, not a vast increase over what it must have been in ancient Babylonia.

But suddenly, between 1869 and 1899, our power-producing capacity doubled per production worker. Technology then provided further increases in the production of power until, in 1954, each worker in American industry controlled 850 percent more horsepower than in 1870 — in kilowatt-hours the equivalent energy of 408 men working with him.

Thus, power has an immediate, dramatic experience with the importance of productivity in technological terms. It has also demonstrated its importance for the power user.

In 1917, we were already selling 25,752 million kilowatt-hours of electricity which were sold for $502,000,000. Since 1917, the price of electricity has gone down 2 percent, while the general price level has more than doubled. At the same time production of electric power has been multiplied 25 times.

Setting an Example

Vast increases in productivity over this span of years have made such a price trend possible, demonstrating a relationship between productivity increases and the welfare of the user which other industries might do well to heed.

Let me state what seems to me the important general conclusions to the collective

or Everyone's Benefit

SECRETARY OF LABOR MITCHELL

bargaining problems which confront all American industries today.

Productivity means the amount of a product a worker turns out in an hour — how many bricks, sheets of steel or shirts, how many columns of figures added, and how many ergs.

More productivity means turning out more product in the same working time. Usually this involves better machines, better trained workers, and improved management.

Productivity improvements in power plants, factories, mines, and on farms have made possible much of our great national prosperity in the past. Out of increased productivity must come further increases in our standard of living.

Increased costs should be covered by increased productivity, for, if they are not, prices rise.

Who Should Benefit?

Some people think that the benefits of productivity increases should be divided only between labor and management — but there is a third party, the consumer.

The consumer should share in increased productivity through better quality goods or lower prices.

This is why increases in labor costs for the economy as a whole ought to be so related to productivity improvement that increases in price levels will not result.

There is a controversy at the moment about applying this general principle to specific bargaining situations, and I want to say a word about it: National productivity figures are averages drawn from many different producers — farms, factories, mines, offices. Applying such averages mechanically is like taking the average size of a dozen assorted men and making them all wear the average size suit.

The same is true even of industry-wide figures. As labor and management well know, there are great differences in the economic situation of different companies and plants within any one industry.

In arriving at what might be a proper wage increase in a particular industry or enterprise, management and union negotiators have no simple, ready-made formula. They should be extremely cautious in the way they use productivity figures. There are many factors other than productivity which determine whether a wage settlement is fair in a specific industry. There is also a national interest at stake.

What to Look for

Certainly labor and management in the major industries must realize that their wage and price actions are often followed by other industries whose situations may be vastly different, with the result that wages and prices go up all along the line. This has frequently been the case.

Labor and management have a tough assignment in arriving at fair wage settlements which will not cause price increases.

Workers and union leaders must be more concerned about real wages, not merely money wages. When making wage demands they should consider what these wages can buy.

Another challenge that lies ahead for labor leaders is to be more constant in conveying to their members what rising costs and prices and the goods they produce can cost them. Wage increases that result in price increases can cut the market for the goods they produce — and, ultimately, cost jobs.

The challenge that lies ahead for management is just as difficult. It is not always possible to take the easy way out of passing along all cost increases to the customer. Some must actively seek ways to trim inefficient practices and tighten up to face competition.

Others must recognize that lower and more flexible prices can improve sales and create jobs. It may even mean reassessing attitudes toward profit margins.

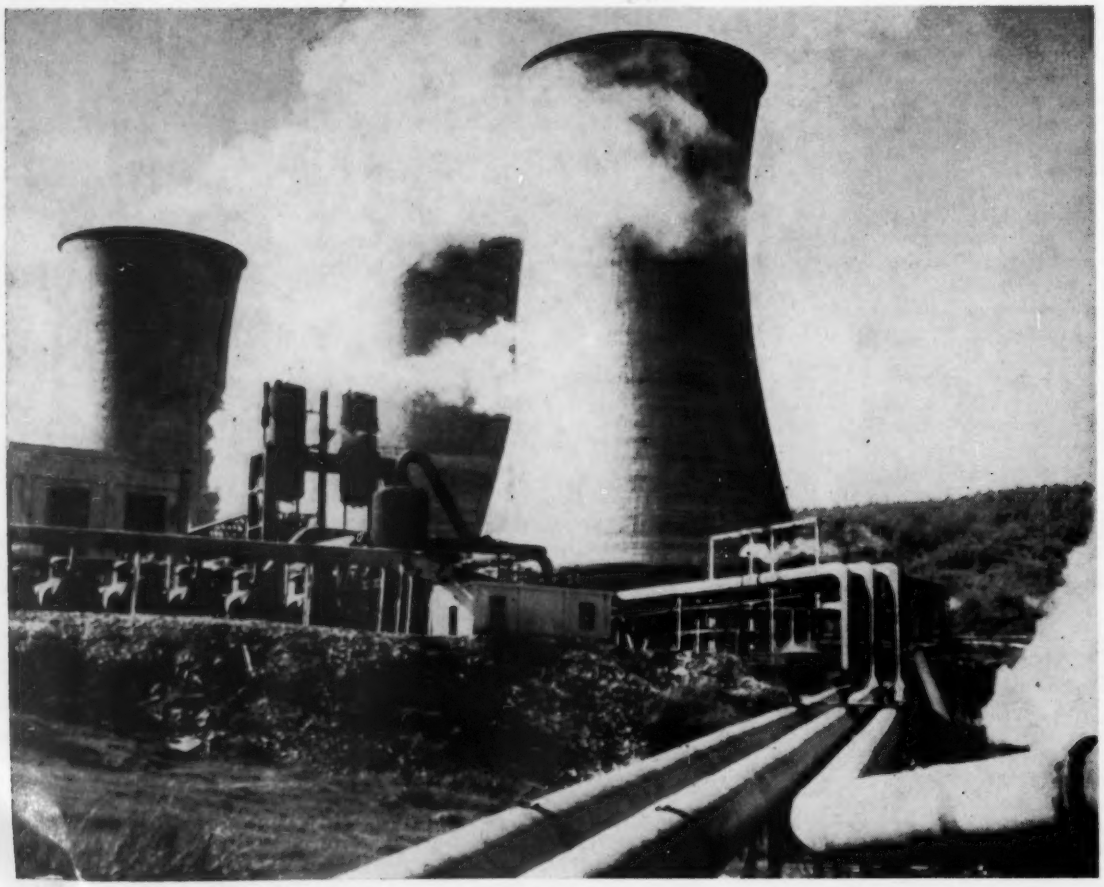
It will certainly mean talking frankly about the effect of wage-cost increases, discussing the economic facts with union representatives.

These are some general conclusions which I suggest for consideration by business and labor leaders in all industries, but I thought particularly worth emphasizing to you because the power industries have proven adaptable, resourceful, and responsible, in the presence of swift technological change. ■

Geothermal Power to Come to U.S.

Plans are being made to develop natural underground steam fields in California to provide steam for the production of electricity. Such geothermic power plants would cost 30 to 40 percent less than present-day steam-electric plants

A PLANT and POWER SERVICES ENGINEER report
by **GEORGE V. MICHAEL**, Managing Editor



Until two years ago, the production of electricity from natural steam and hot water was limited to the one geothermic plant in Italy.

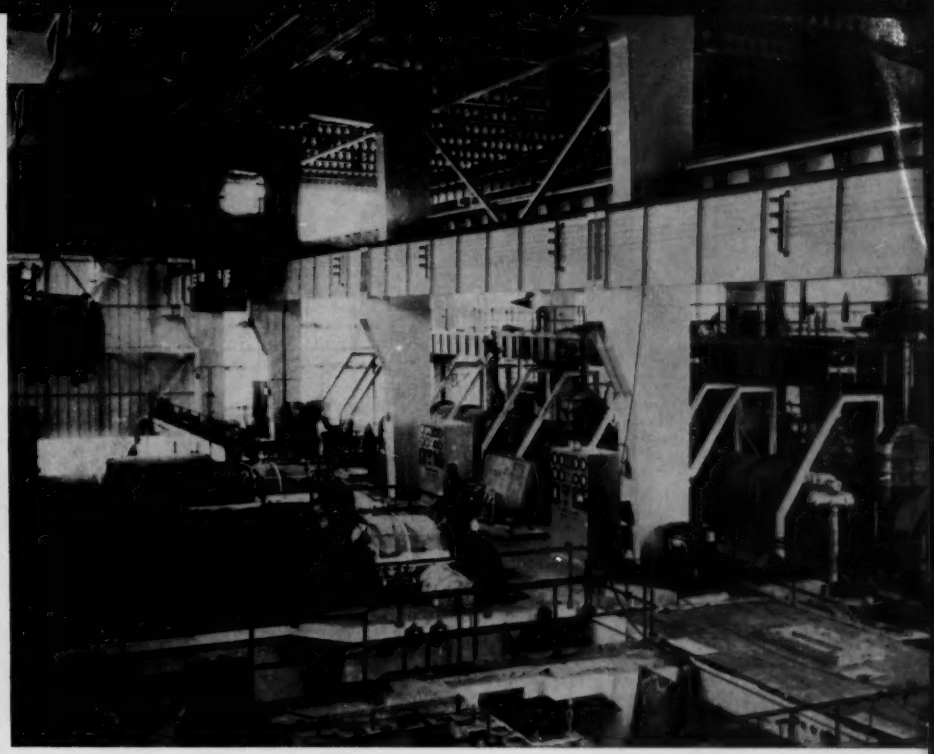
Today, both New Zealand and the USSR are producing electricity by this means. It is expected that the United States will follow in a short time.

Magma Power Company of California is now engaged in the business of discovering, developing and producing geothermal steam for sale to power companies.

Confident of the progress that will be made, Energy Fund Incorporated, a mutual

World's first geothermic power plant in Lardarello, Italy. Pipes in the foreground tap natural steam from vast volcanic wells. The huge thimble-shaped condensers in background change steam into water which is distributed to industrial plants in the region. Plant's present capacity is in excess of 250,000 kw

Steam billows from man-made geysers in the Wairkei valley, New Zealand, where natural steam is being harnessed to produce electricity. Funnel-like cylinders at the exhaust point are silencers



Interior of the New Zealand geothermal power station. At right are the separators; at left, the generators. Present capacity of the plant is around 69,000 kw

fund investing in energy industries and companies, has acquired a position of 12,500 common shares and 2500 six-percent convertible preferred shares in the company.

Magma Power has an agreement with Pacific Gas and Electric to tap the underground supply and furnish steam to a 12,500 kw turbine-generator at the natural steam geysers in Sonoma County, California, which are jointly owned by Thermal Power Company.

Additional generators will be built as the first installation meets expectations and as steam wells are produced.

America's first harnessed steam geysers will have an estimated capacity of 10,000 kw. As no boiler plant is necessary, a 30 to 40 percent saving in overall power plant cost will be achieved.

Geothermal steam is steam produced from heat within the earth. It is thought that geothermal steam comes from the hot magmatic mass lying beneath the outer crust of the earth, which, as it gradually cools and crystallizes into rock, gives off its water vapor in the form of superheated steam.

Such steam may remain trapped far below the surface, or it may rise to the surface through faults or cracks in the earth's crust and manifest itself as hot springs, fumaroles, volcanoes or geysers such as "Old Faithful."

It is thought that by drilling wells into geothermal areas at or near the fault lines along which the steam is believed to move, the flow of steam to the surface can be accelerated and useful energy obtained.

The tremendous reserves of heat in the earth's center lie beneath an outer shell estimated to be 20 miles thick in most places. In some areas, heat and steam may be tapped close to the surface due to venting, fracturing or faulting. The underlying magma has an estimated temperature exceeding 3000°F, and has an estimated water content of about 10 percent, permitting creation of almost limitless amounts of steam.

Actually within the past few years, there has been a concentrated world-wide effort to discover new geothermic fields for power use. Additional fields have been discovered in Mexico, France, Burma and Kenya.

Considerable geothermic resources in Mexico are now under active development. In the West Indies, exploration drilling was begun on the island of Santa Lucia. Geothermic energy has been found at two places in El Salvador.

Iceland's large geothermic resources — long used for space heating — are going to be used to produce salt from the sea, which will reduce imports of salt required in that country's fishing industry. Also, the possibilities of producing heavy water by using geothermic energy have been investigated in Iceland.

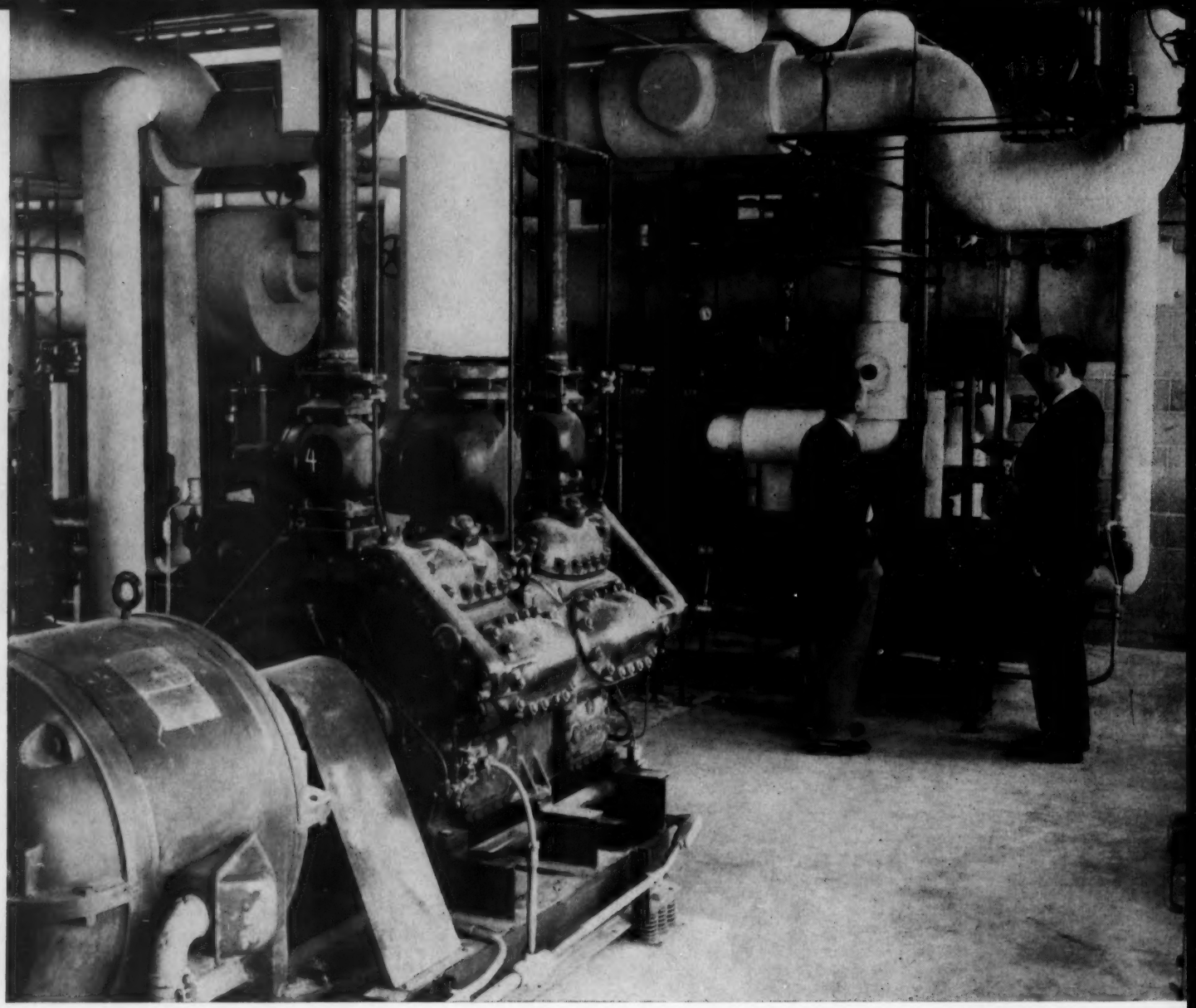
The world's first geothermic power plant located in Lardarello, Italy, supplies industrial plants in that region with some two billion kilowatt-hours of electricity a year. The steam supply is expected to last at least 11,000 years. Present capacity is in excess of 250,000 kw.

The Soviet Union's plant has begun operation on the Kamchatka Peninsula, but we have no information on how large its capacity is.

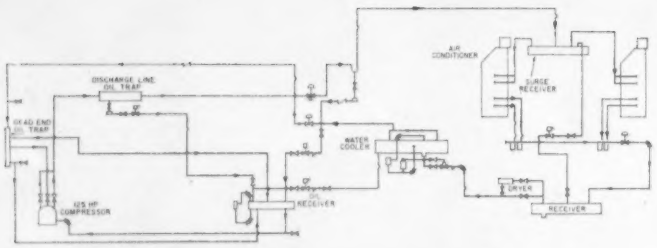
New Zealand's first geothermic power station at Wairakei received much attention last year. At that time, geothermal steam was driving high turbines to produce an initial output of 6500 kw. By now, other geysers have been harnessed to increase the capacity to around 69,000 kw. Final output is planned at 200,000 kw.

These foreign projects are all government subsidized. The Magma Power Company's project will be the first all-privately financed geothermal plant anywhere in the world.

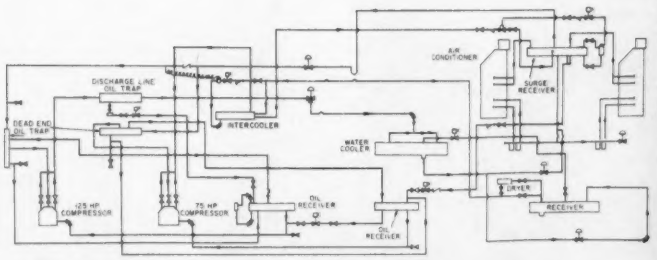
And, if the Magma Power project works out, we can look forward to a new power revolution. Someone may even get the idea to put "Old Faithful" to work supplying electricity for Yellowstone National Park. ■



Air source heat pump system at Sylvania's Amherst Engineering Lab — In the background, Sylvania's plant engineer is studying the cooler-heater with manufacturer's representative. In foreground can be seen the low-stage compressor in one of the two identical systems



SCHEMATIC OF COOLING CYCLE



SCHEMATIC OF HEATING CYCLE (for temperatures below 20°F). ▸ Only one compressor is used for temperatures above 20°F

for both summer cooling and winter heating . . .

Northernmost industrial heat pump finishes first year of operation

MAXWELL C. SCOTT
Manager
Amherst Engineering Laboratory
Sylvania Electric Products Co.
and **HARRY KROLL**
Branch Manager, Rochester Office
York Corporation
with **P&PSE Staff**

Operating through one of the most severe winters Buffalo, N.Y., has had in the past few years, Sylvania's "Show Case" heat pump has exceeded all expectations as a heating unit. Its cooling cycle passed the test in this summer's real hot, humid weather. Most important of all — for the first operating year THERE HAVE BEEN NO MAINTENANCE COSTS

A NEW era in industrial heating and cooling was ushered in with last year's opening of Sylvania's Amherst Engineering Laboratory near Buffalo, N.Y. The laboratory is being both heated and cooled by a compound-compression air-source heat pump.

This installation makes the lab the northernmost industrial building to be heated by an air source heat pump requiring no supplementary heating system of any kind.

Now, after about 14 months of operation, the story of its successful operation can be told.

The installation was designed to run at an inside summer condition of 78°F dry bulb and 50% relative humidity with outside design of 93°F dry bulb and 75°F wet bulb.

In winter, the inside design is 70°F dry bulb with outside design at −5°F dry bulb.

This first year of operation has shown that — under the conditions of one of the most rugged winters for that area and a contrastingly hot, humid summer—the heat pump demonstrated its ability to handle both the heating and cooling jobs with equal efficiency. No special or extra insulation was used in the building construction. It was insulated the same as an ordinary building.

As this installation had become a "Show Case" for engineers considering similar units, it was under constant observation throughout the year — particularly during the winter. On one typical day, the outside temperature was 18°F, the winds were high and gusty, and the heat pump — running on single-stage at 25 percent capacity — had no trouble keeping the building comfortable.

Other results? Sylvania is now planning an expansion to the present building. With the present heating setup, they will need no additional heating for this expansion (although an additional compressor will be needed for cooling).

To next page

On the supervisory data center and control panel, the precise temperature in a given area can be indicated by pressing a button

Northernmost industrial heat pump finishes first year of operation

From preceding page

Operating costs? The first year's operating costs were found to be comparable to those of any other dual heating and cooling system in that area.

Maintenance? There have been no maintenance costs at all for the first year!

Using no conventional fuels, but only the electricity needed to run the equipment, the system extracts heat from the outside air, even in below-zero weather. The heat removed from the outside air is raised to a useable temperature level by refrigeration compression. This heat is used to produce hot water which is circulated to air conditioning apparatus throughout the building.

The same refrigeration equipment that cools the building during the hot summer months therefore heats the 85,000-sq ft, two-and-one-half story structure during Buffalo's usual frigid winter weather.

The heat pump system is located in a specially designed engine room adjacent to the main building. It has a capacity of 250 tons of cooling in summer and 2,400,000 Btu per hour for winter heating.

The system consists of two identical systems, each made up on one 125-hp high-stage, 16-cylinder, 1170-rpm compressor, two air cooler-condensers and one 22″ by 12′ water cooler-heater.

Hot or cold water is circulated to air conditioning units by a 20-hp pump.

There are 96 fan coil air conditioning units around the perimeter, and the interior areas are air conditioned by a zoned low-pressure air system through various types of ceiling diffusers.

Special areas are conditioned with a local recirculation system. Return air in these units is mixed with conditioned air to regulate temperature conditions in a given area with a load varying from zero to 100 percent.

Four (two in each system) air units on the roof of the engine room act as air coolers in winter and evaporative condensers in summer. The single water cooler-heater in each system switches automatically from cooling in summer to heating in winter.

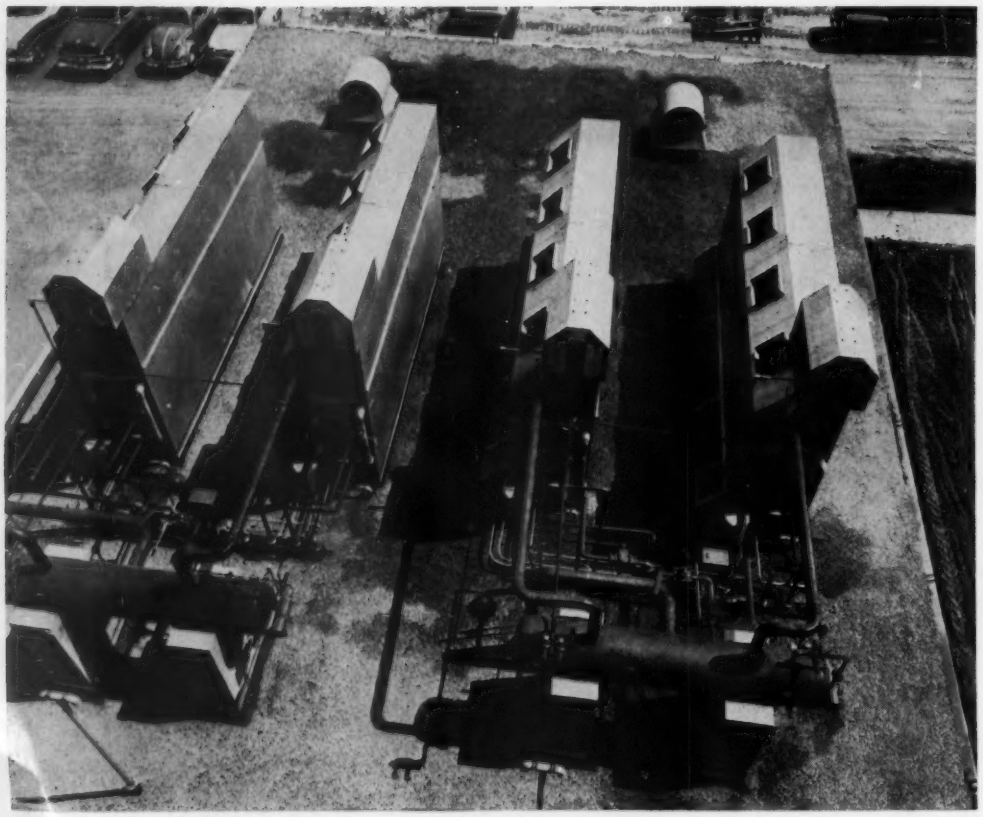
The entire system is controlled by a Minneapolis-Honeywell data center and control system which actuates pneumatic valves to switch from heating to cooling or vice versa, depending upon outside air temperature and interior building requirements.

A temperature-indicating device instantaneously registers temperature levels in various parts of the building on the central control panel at the touch of a button. The control panel also features an electronic recording temperature controller which records the outside air temperature and the temperature of water returning to the cooler-heater. The water temperature is controlled by varying compressor capacity or number of compressors on the line.

The fan systems are located in a penthouse atop the roof of the laboratory. Total cfm is aproximately 65,000.

Jacob Fruchtbaum, Buffalo, was consulting engineer and the John W. Cowpers Co., also of Buffalo, was general contractor.

(Heat pump system is development of York Corporation, a division of Borg-Warner Corp., Dept. P&PSE, York, Pa.)
Circle 9414 inside back cover.



All four evaporative condensers-outside air coolers are located on roof of engine building

PRECISION | NEW SOLUTIONS

NEW SOLUTIONS

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Silicon controlled rectifiers serve in regulating drives

Units serve as power amplifier to give drive accuracy on paper machines

For the first time, silicon controlled rectifiers have been successfully applied to a complete, coordinated drive system. The tiny solid-state devices serve as a power amplifier in the regulating system of each of five sections added to an existing paper machine. The high-accuracy drive system has been installed at the Wisconsin Rapids Division of Consolidated Water Power & Paper Company.

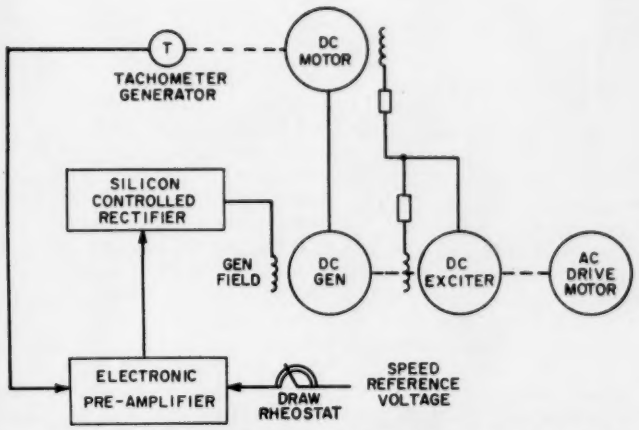
The added sections include two coaters, two dryers and a calender-reel which increase the 138" paper machine's utility.

In each of the five new sections, the controlled rectifier serves as the power amplifier in a regulating circuit which also employs a pre-amplifier, a tachometer, and a tensiometer feedback to provide the necessary drive accuracy.

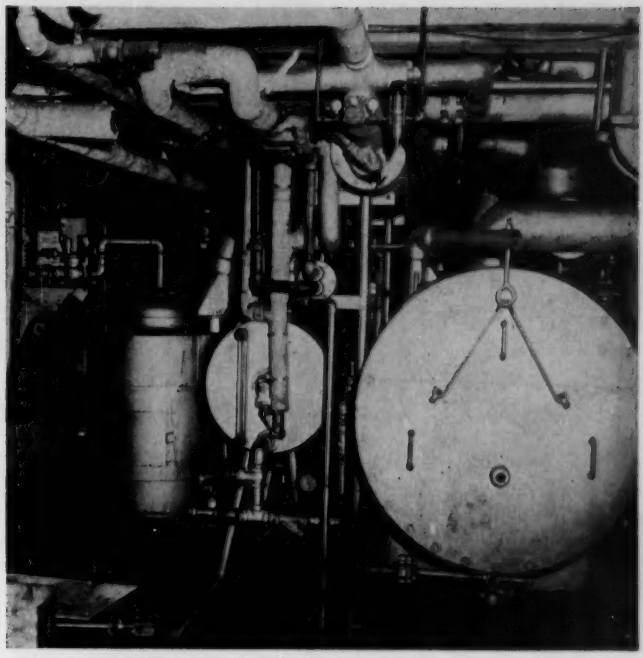
Since the device is static, maintenance is greatly reduced. Contamination and corrosion of key electrical components have no effect on the operation of the device.

The controlled rectifier performs the same functions as do magnetic amplifiers, rotating amplifiers, and electronic power tubes. It is, however, only about one-fifth the size of the electronic tube and has a greater maintenance-free life.

(Silicon controlled rectifier is product of General Electric Company, Dept. P&PSE, Schenectady 5, N. Y.)
Circle 9415 inside back cover.



Schematic diagram of accurate drive regulating system employing silicon controlled rectifiers as power amplifiers



Compact, 65-bhp water-tube boiler (arrow) puts out more steam, but takes up only one third the space of 50 bhp fire-tube package boiler on right

Save $6000 on compact boiler's easy installation

Wisconsin Packing Company of Milwaukee saved $6000, 68 square feet of boiler room space, and got 20% more steam by installing a compact 65 hp water-tube boiler.

When meat packing operations jumped from 150 to 350 head of beef per day, the company found they were short of steam for building heat and heating water.

Steam for water heating is circulated through a heat exchanger with a capacity of 3000 gallons per hour raised from city water temperature to 200°F. Biggest steam load of the day comes when four steam/hot water hoses are used for clean-up at the end of each slaughtering cycle.

The company had been operating with a single 50-hp fire-tube package boiler. Proposed cost of installation of another similar unit in basement boiler room was $12,500, due to necessary excavations and enlargement of openings.

With 4 x 7 foot floor area water tube boiler, it was not necessary to enlarge any openings or make excavations for movement of the boiler.

For the past 18 months, the gas-fired, water tube unit has operated 24 hours per day. Only necessary maintenance has been water pump repacking and repair of a solenoid valve.

(Modulatic package boiler is manufactured by Vapor Heating Corp., Dept. P&PSE, 6420 W. Howard St., Chicago 48, Illinois.)
Circle 9416 inside back cover.

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Close-up view of an IRVICO pressure-locked aluminum grating carefully engineered to fit precisely around pipes and valves in a modern water-pumping station.

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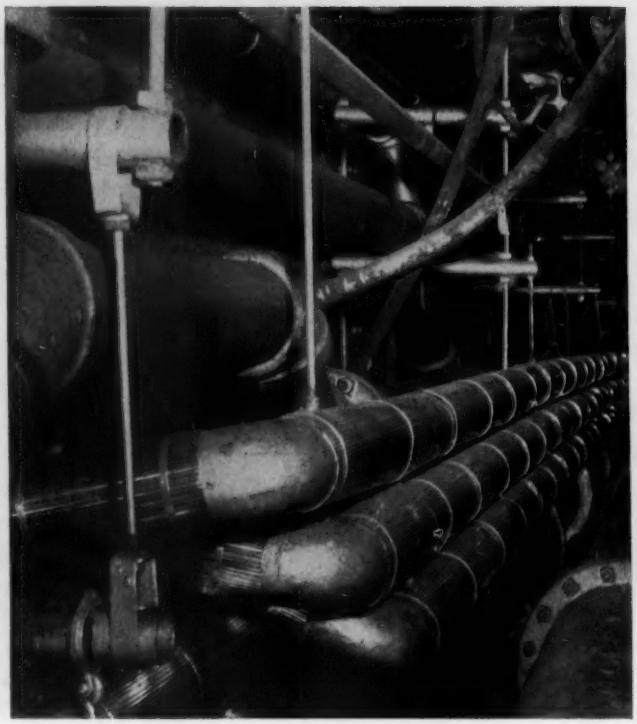


After: Aluminum jacketing cuts pipe insulation repairs to a minimum — reduces heat loss from steam lines

Before: Maintenance of tunnel piping insulation was continual problem

Aluminum jacketing stops costly repairs on pipe insulation

Eliminates moisture problem on underground piping

HAWTHORNE Works of Western Electric Company in Chicago covers almost 140 acres. Supplying all its buildings with services from the main power plant requires an extensive system of underground piping.

For many years, maintenance of the insulation on this piping was a continual problem and a never-ending expense. Dampness and water drippage would deteriorate the insulation, making it susceptible to damage. Periodic patching and repainting of the covering was costly.

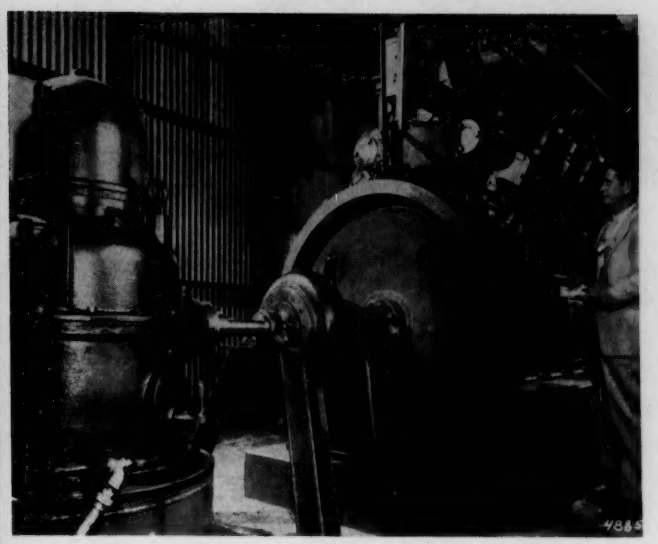
In February, 1951, the piping and insulation was considerably damaged. When plans for repairs were made, it was decided to do something about the insulation maintenance problem, and as a result, aluminum jacketing was installed.

Because it is corrugated, the jacketing is extra strong and resists damage. Its lap-sealing construction makes a tight joint and makes it easy to re-install after being removed for repairs to the piping. Plant personnel have no trouble reading line identification symbols that were often obliterated on the unprotected insulation.

Heat loss by radiation is greatly reduced.

And best of all, the cost of repairs to damaged insulation during the last seven years has been reduced to a minimum.

(Aluminum jacketing is a product of Childers Manufacturing Co., Dept. P&PSE, PO Box 7467, Houston 8, Texas.) Circle 9418 inside back cover.



Coupling handles misalignment of about 4 degrees angular and 1/8 inch parallel

Rubber-tire coupling cuts downtime; handles misalignment

Couplings of the universal joint type had to be lubricated periodically — and replaced about every two months — during the pumping season at stations operated by American Canals Company in Texas. The stations deliver water to irrigation ditches at a rate of 32,000 gpm.

The downtime resulted in a heavy loss of pumpage. Ideally, the 175-hp gas engines and propeller pumps should run without interruption during the six-month growing season.

In an effort to reduce downtime, the company purchased a rubber tire coupling. Besides offering exceptional capacity for handling angular and parallel misalignment, the coupling has the ability to absorb torsional vibration and shock loads.

The 22-inch diameter coupling was installed on the shafts connecting the engine with the pump. Misalignment was about four degrees angular and 1/8" parallel.

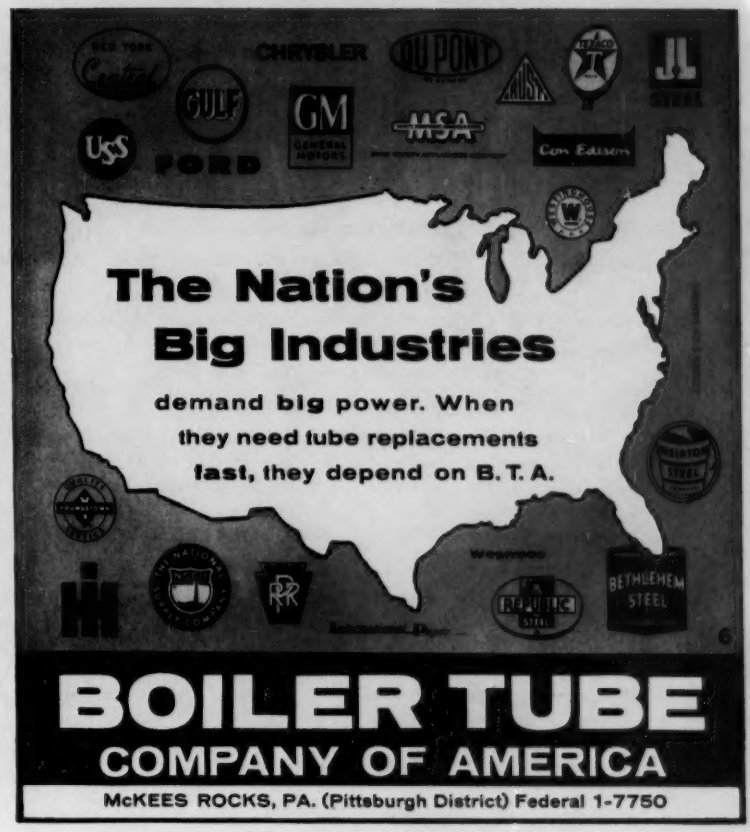
The coupling worked perfectly all season, requiring no lubrication or other maintenance.

The heart of the coupling is a tire with synthetic tension members bonded together in rubber. Twin flanges, which clamp the tire in place and allow it to flex under stress, are mounted on shafts by means of patented bushings.

The bushings give the equivalent of a shrunk-on fit, and permit quick and easy application to shafts. The rubber tire can be replaced when worn by removing the flanges from the shafts.

(Para-flex Flexible Cushion Coupling is product of Dodge Manufacturing Corporation, Dept. P&PSE, Mishawaka, Indiana.)

Circle 9419 inside back cover.



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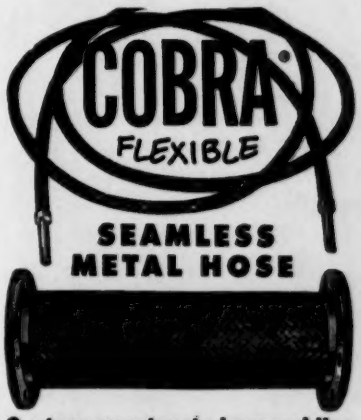
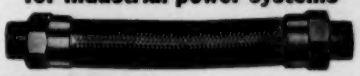
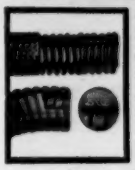


Custom constructed assemblies for industrial power systems





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Circle 9422 inside back cover.

Guards against accidental scaldings

Thermostatic control gives proper hot water from single-temperature system

Installations with single-temperature hot water systems can control outputs of hot water at lower temperatures by installing inexpensive thermostatic water controls.

This is the experience of the Convalescent Hospital for Children, Cincinnati, which uses two such controls to protect children who are unable to feel the heat of scalding water.

The 100-bed hospital has a single-temperature hot water system delivering water at 180°F for kitchen, laundry and bathing use. A separate low-temperature system for bathing use only would be too costly to install.

To prevent scalding accidents, the hospital installed two controls to serve two bathtubs each.

The controls are mounted on the water lines on the floor below the bathrooms and are regulated only by the hospital engineer.

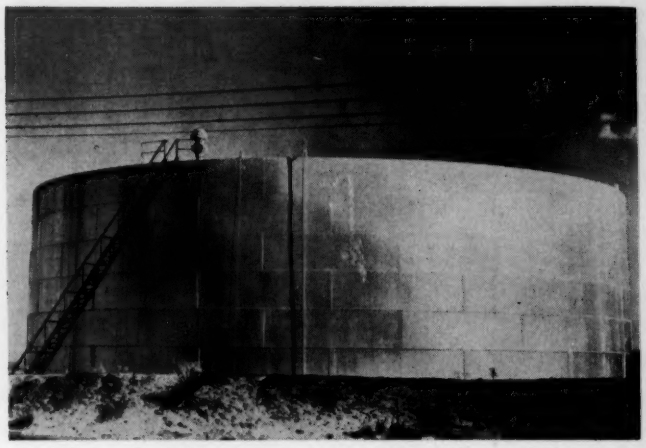
Hot and cold water are blended in the controls and delivered at a maximum temperature of 110°F.

The nurse or patient can make the water cooler by turning on the conventional cold water valve on the tub, but it is impossible for hotter water to enter the tub.

An automatic shut-off on the control unit instantly stops the flow of water if the temperature should exceed 110°F. The control operates thermostatically and responds to any fluctuations in water temperature and pressure.

("Hydroguard" controls are manufactured by The Powers Regulator Company, Dept. P&PSE, 3434 Oakton St., Skokie, Ill.)
Circle 9423 inside back cover.

Inexpensive hot water controls eliminate need for separate low-temperature hot water system



Oil tank repairs made with epoxy compound have stood up well throughout severe Saskatchewan winter

Epoxy compound handles tank repair as well as welding, costs less

Canadian installation proves its effectiveness in cold weather

The severe climate of Moose Jaw, Saskatchewan, increases the problem of stress from thermal expansion where tank repairs are concerned.

Engineers at the refinery of The British American Oil Co., Ltd., have found that caulking leaks in oil storage tanks with an epoxy resin compound can provide better and more economical repairs than older methods.

Previously, they had relied on seal welding as the only sure method of stopping tank leaks. But this method is expensive and requires not only emptying the tank but also rendering it completely gas-free.

Mechanical caulking did not always prove satisfactory.

When several small, active leaks were discovered in June, 1958, the refinery decided to experiment and repair them with an aluminum-filled epoxy resin compound.

The leaks had occurred at both the seams and rivets of some of the older tanks. Cleaning the leaks down to bare metal uncovered a hair-line opening ⅛" long at a riveted lap joint.

The epoxy compound was used as the repair metal. At the time of repair, the ambient temperature was about 80°F and the tank temperature about 110°F. To reduce thermal expansion stress, the epoxy compound was applied as thinly as possible.

Examination of the results this spring showed repair to be about 90 percent successful. Repair of a larger leak in another tank was a complete success.

Refinery engineers believe that the difference in performance may be due to the special precautions for cleanliness that were taken before the large leak was caulked. It was possible that, in the tank where so many small leaks occurred, all were not adequately cleaned, or that not all were exposed during repair.

(Metalset A-4 is manufactured by Smooth-On Manufacturing Company, Dept. P&PSE, Jersey City, N. J.)
Circle 9424 inside back cover.

NEW SOLUTIONS

Reduces discharge noise from vacuum pump

During the installation of a vacuum pump at a Wisconsin paper plant, a series of tests were made to determine the efficiency of a combination snubber-water separator unit

One unit serves as both water separator and silencer

in the reduction of discharge noise of the pump.

Water-sealed vacuum pumps usually require independent water separators and silencers when the discharge noise is excessive or objectionable.

Tests were run with the vacuum-pump outlet-pipe open to atmosphere and with the vacuum pump operating at 257 rpm with 28 gpm of seal water. The discharge velocity was 5100 fpm; fundamental frequency was 85½ cps.

The overall noise level was considered to be higher than would be recommended in a satisfactory working area.

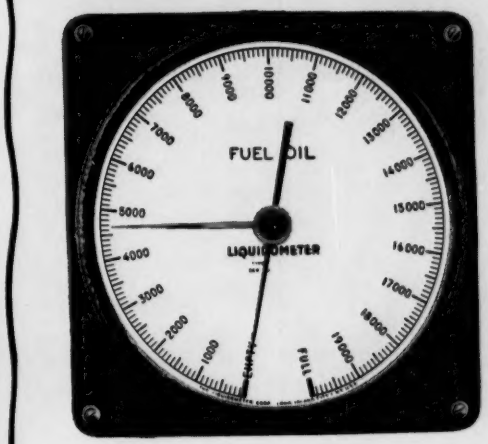
The snubber was installed, and tests showed an attenuation of 18db of the overall noise level.

The fundamental frequency was reduced 12db, and noise previously attributed to a first harmonic was entirely eliminated.

Water separation at 28 gpm was entirely satisfactory, and the installation demonstrated unit's efficiency in both its water separation and silencing functions.

(Water Separator Snubber is product of Burgess-Manning Company, Industrial Silencer Division, Dept. P&PSE, 9207 Sovereign Row, Dallas 35, Texas.)

Circle 9425 inside back cover.



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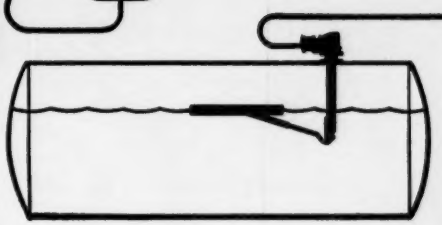

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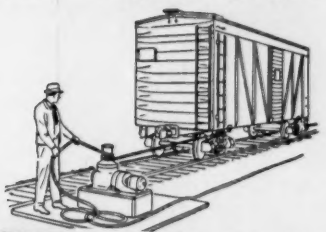
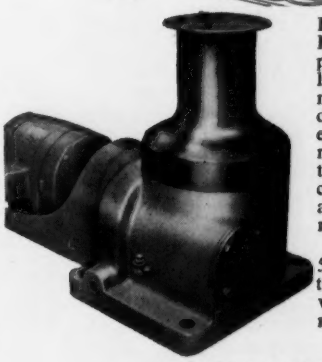
Circle 9426 inside back cover.

DOWN GOES DEMURRAGE

...with LINK-BELT car spotters





Powerful, compact Link-Belt car spotters speed positioning of cars for loading and unloading . . . minimize switching and demurrage costs. They put enough power in one man's hands to move 300 tons or six loaded freight cars. And operating costs are low, maintenance negligible.

Available *from stock* in 5- and 10-hp sizes, stationary and portable types, with integral or separate motors. 15.235

SEND FOR NEW BOOK 2892

LINK-BELT

CAR SPOTTERS AND CAR PULLERS

LINK-BELT COMPANY, Prudential Plaza, Chicago 1, Ill.

Circle 9427 inside back cover.

AB

MAINTENANCE Testing of ELECTRICAL EQUIPMENT

High Potential Breakdown
Leakage Current . . Shorts

HYPOT® . . . non-destructive testing of heavy duty motors, cables, and other electrical equipment . . . to determine leakage current, insulation resistance and shorts.

Models for laboratory, portable and automated testing. Test voltage collapses upon insulation breakdown, preventing damage to equipment.

HYPOT® DC Testers, semi-portable type, (illustrated) for testing equipment operating at potentials up to 9500 v a-c-, with test potentials adjustable from 0 to 30,000 v d-c. Also HYPOT® mobile type, provides tests to 150 kv, d-c. Write for bulletin "HYPOT®"

NEW Instrument Bulletins

Practical operating data . . . "Predict Motor Failure", "Detecting Bad Grounds Lessens Equipment (Telephone) Failure", "DC Voltage Tests on Stator Windings". Write for your copies, today. 10-35.6

NOW Insulation Resistance is EASY-to-READ

motors • controls • cables

VIBROTEST®
Megohmmeter

Impending failure of electrical equipment is revealed by insulation resistance tests . . . preventing damage to equipment from breakdown under load.

Measurement of insulation is as easy with the VIBROTEST® as checking line voltage.

VIBROTEST® Model 201. measures resistance to 200 megohms with 500 v d-c test potential. Has 0-2000 ohm and 0-150-300-600 v a-c- and d-c ranges for general testing. Self-contained power supply eliminates cranking. Complete, $136.50. Write for bulletin "VIBROTEST®"

SPECIALIZED Instruments

Phase Sequence Indicator shows phase rotation. No batteries or moving parts. . . . "Thumper" Cable Fault Locator pinpoints defects in cable insulation . . . Transformer Oil Tester . . . Geophysical Subsoil Analysis. Instrument Current Transformers . . . and many more. Write, outlining your needs.

ASSOCIATED RESEARCH, Incorporated
"Electrical Testing Instruments Since 1936"

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Circle 9428 inside back cover.

NEW DEVELOPMENTS

for

effective plant and power services operation

Three models of vibratory horn have six different mounting variations each

Compact vibratory horn can fit almost anywhere, is louder

Created to simplify the installation of emergency alarms and coded signals in industrial plants, institutions, and public buildings, vibratory horn is based on a new modular design concept. The horn provides a choice of three styles, each with six different mounting variations.

The compact basic horn unit fits into any four-inch square electrical outlet box. Equipped with an individual volume control, each basic horn can be adjusted from a barely audible buzz to an attention-commanding 101-103 db at 10 ft.

Three models available include: grille type for offices, labs or other general areas; single projector style where the alarm must be megaphoned at longer range; and double projector for two-directional distribution.

All horn models and accessories are interchangeable. All are attached to the basic horn unit by a simple, two-screw connection which can be completed in a few seconds.

Variety of mountings available include:

For regular interior surface mounting on wall, ceiling or post where electrical conduit is exposed, the basic unit is mounted on a four-inch outlet box.

If the outlet box is plastered in, another mounting variation provides a semi-flush appearance with only 1¼" of grille projecting beyond the wall surface plate.

For completely flush mounting, the basic unit may be placed inside a special back box plastered into the wall, utilizing a flat-type grille which is entirely flush to the wall.

By itself, the basic unit can be positioned on a control panel, inside a cabinet, or used where no rear housing is required. For exterior use, a weather-proof gasketed, cast back box is available.

All external parts, including grilles and projectors, are made of die-cast aluminum, finished in gray hammertone enamel. Various colors and finishes can be furnished.

(Vibratone horns are manufactured by Federal Sign and Signal Corporation, Dept. P&-PSE, 8700 S. State St., Chicago 19, Ill.)

Circle 9429 inside back cover.

Automatic transfer switch is rated at 600 amps

Featuring an improved arc-chute design that provides positive protection of all main contacts, automatic transfer switch is available in NEMA Size 6. It is electrically operated, mechanically held, and is rated for all loads to 600v AC and 250v DC. Continuous duty current rating is 600A.

Ratings are the same for all loads (tungsten, inactive, etc.) and for open or enclosed units.

The switch is constructed with dual-coil operating mechanism to give positive action without need for delicate springs, latches or counterweights.

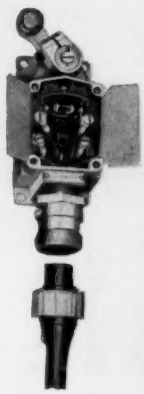
The stroke provides fastest possible transfer from one locked position (normal voltage) to the other locked position (emergency voltage). Copper contacts with rolling and wiping action assure longer contact life.

(Automatic transfer switch is manufactured by Zenith Electric Company, Dept. PI-5, 152 W. Walton St., Chicago 10, Illinois.)

Circle 9430 inside back cover.

Heavy-duty limit switch can be replaced without rewiring

Featuring a "power plug" which connects the power cable to the switch with a threaded coupling, a heavy-duty limit switch can be replaced without disturbing wiring. To replace a switch mechanism, all that needs to be done is to remove the four mounting screws, disconnect the power cable, and lift off the switch. A new factory-wired switch can then be mounted, and the power cable reconnected. No wiring of any kind is necessary.



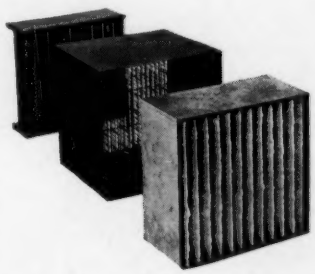
(Limit switch is product of Square D Company, Dept. P&PSE, 4041 North Richards St., Milwaukee 12, Wis.)

Circle 9431 inside back cover.

Combination filter frame simplifies installation for odor, dust removal

Combination mechanical filter and charcoal filter frame has been developed to provide a compact filter bank for both dust and odor removal.

The upstream portion of this permanent steel frame holds a standard 12" deep filter cartridge in a choice of 95%, 85% or 35% discolora-



Mechanical and charcoal filters fit in one frame

n efficiency on atmospheric st. The downstream end is signed for easy installation an activated charcoal filter the user's choice.

The entire unit — frame, echanical filter and activated arcoal filter — can be sup- ied as a complete package. The mechanical filter ef- ctively protects the charcoal ter from plugging with dust d loss of odor-removal ca- city.

Unit has a capacity of 1000 m, and overall dimensions e 24" by 24" by 21" deep. (Combination AERO-DLVE-charcoal filter is anufactured by Cambridge ilter Corporation, Dept. &PSE, 738 East Erie Blvd., racuse 1, N.Y.)

rcle 9432 inside back cover.

For more information on items reported in the New Develop- ments section circle correspond- ing numbers on reader service card inside back cover.

emoves carbon, ixes with oil r water

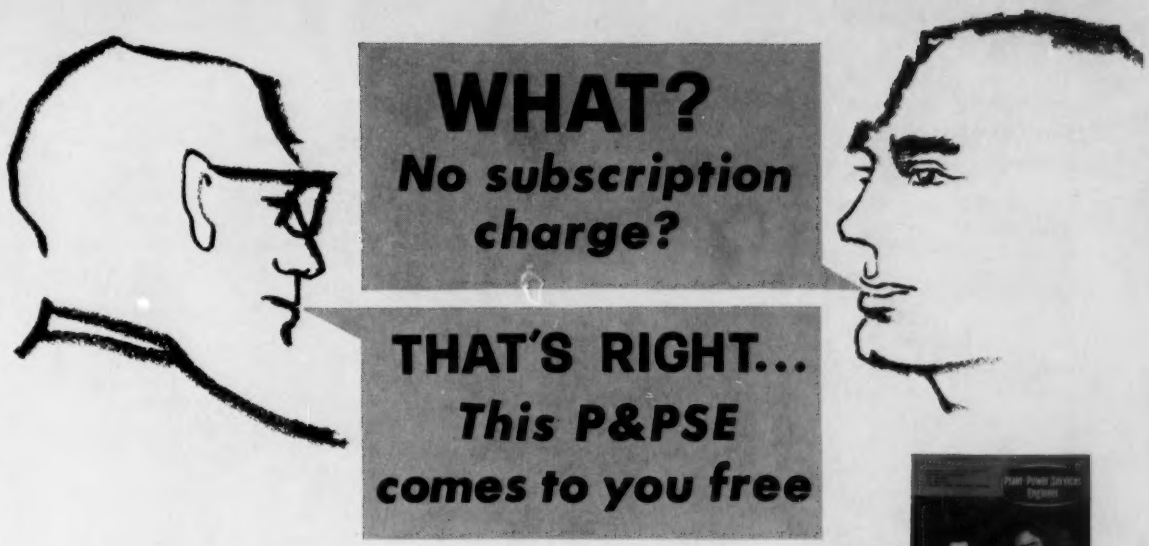
Solvent detergent is de- gned to remove carbon from istons and to clean a wide ariety of engine parts.

The material is effectively ixed with water or with pe- oleum distillates. It may be sed at room temperatures or eated to about 100°F and is asily rinsed with water or team.

It contains no phenolics, so isposal of spent solutions resents no special problem. ield tests have shown its ef- ciency in cleaning diesel pis- ons, bronze oil filters and arbonized engine parts.

(Composition No. 111 is roduct of Oakite Products, nc., Dept. P&PSE, 157 Rec- or St., New York 6, N.Y.)

Circle 9433 inside back cover.



...ever wonder WHY?

Maybe, like many others, you've wondered why PLANT and POWER SERVICES ENGINEER comes to you without charge — while, perhaps, you pay a subscription price for other business magazines.

Maybe, you've thought publishers make money when they sell you a $5.00 or a $10.00 subscription.

NO —

Publishers lose money . . . yes, most business magazines lose money when they sell a subscription — not only because the magazine costs more to produce than the subscription price brings in — but also because the cost of making such sales exceeds the income from $5.00 or $10.00 subscriptions.

ADVERTISERS PAY THE BILLS

You see, it's the money that comes from advertising that keeps the business magazine publisher in business. So, logically, such advertisers demand best possible coverage of folks like you — the important key engineers who exercise buying power in regards to plant and power services products.

SO —

PLANT and POWER SERVICES ENGINEER "hand-picks" best readers . . . and sends the magazine to these key engineers, without charge.

For publishers can't get maximum coverage of these important engineers by trying to sell subscriptions. These men, limited in number, are scattered all over the U.S.A. Travel and/or direct mail efforts cost money. A large share "forget to renew" each year. And, no matter how much time, money and pressure, publishers would put on them, there are always some important men who will never buy.

PLANT and POWER SERVICES ENGINEER GETS THE BEST CIRCULATION.

As you can see, to get the best, most effective circulation coverage, the best way is to "hand-pick" the right readers, then send the magazine to them. In this way, we can direct our editorial efforts solely and completely to serving this "hand-picked" audience.

This, too, gives advertisers maximum value — value that can't be obtained in any other way.

THAT'S WHY —

PLANT and POWER SERVICES ENGINEER "hand-picks" only qualified readers . . . the key engineers responsible for plant and power services in all kinds of industry, in utilities, in large public and private institutions, and in consulting capacities. Then, the editors make the magazine so interesting, so valuable, these men want to read it.

That's why PLANT and POWER SERVICES ENGINEER spends many thousands of dollars on each issue — to give you this valuable service.

That's why PLANT and POWER SERVICES ENGINEER comes to you without charge.

a ***READER-ACTION*** *magazine*

Plant and Power Services Engineer

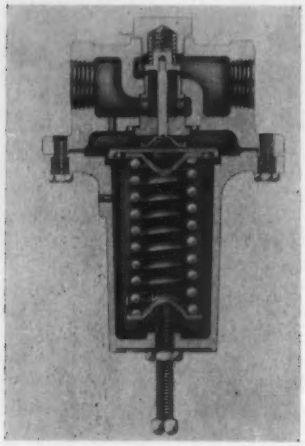
published monthly by
PUTMAN PUBLISHING COMPANY
111 E. Delaware Place, Chicago 11, Illinois

publishers of CHEMICAL PROCESSING, FOOD PROCESSING, FOOD BUSINESS, PLANT and POWER SERVICES ENGINEER

Regulating valve designed for both steam and air

Providing accurate control of pressures for a wide variety of plant applications, direct-operating reducing valve is designed for both steam and air service.

The valve features accurately sized and located ports



Diaphragm chamber is isolated for stability

to minimize fall-off, isolated diaphragm chamber for maximum stability, large body passages, and lapped seating surfaces for tight shut-off.

A variation is made with a special soft seat for air service.

Specifications include sizes of ½", ¾" and 1" in iron construction, and reduced pressure ranges of 2-12, 8-50, and 25-150 psi.

(No. 17-1 regulating valve is product of Mason-Neilan, a Division of Worthington Corp., Dept. P&PSE, Nahatan St., Norwood, Mass.)
Circle 9434 inside back cover.

Standoff insulators are flame retardant

Line of flame-retardant, center-post type, standoff insulators for switch, fuse and bus support are molded of fiber-glass-reinforced polyester.

The five off-the-shelf insulators range from 2½ to 3½ inches high. Steel-plated inserts, ⅜ by 16 inch, ½ by 13 inch, or ⅝ by 11 inch, are available.

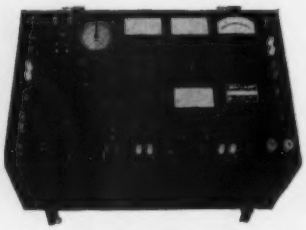
The insulators have dimensional accuracy and impact strength greater than porcelain and arc-resistance superior to phenolic.

(Flame retardant insulators are manufactured by The Glastic Corporation, Dept. P&PSE, 4321 Glenridge Road, Cleveland 21, Ohio.)
Circle 9435 inside back cover.

Protective relay tester features 3 metered current sources

Featuring three metered current sources, protective relay tester is suitable for field and laboratory testing of a full range of AC, current- and voltage-activated relays, circuit breakers, current transformers and insulation resistance of such equipment.

The tester has a continuously adjustable transformer for current or voltage load, plus suitable instrumentation.



Unit tests relays, circuit breakers, current transformers and insulation of such

One metered current source is a reactor circuit available for general relay testing. The reactor suppresses harmonics caused by saturation of core structure on certain types of relays.

The second current source is an auxiliary for differential relays. The third source is direct current for target and seal-in relays. The AC voltage source is also metered.

The 2kva, 240 or 120v, 60-cycle, single-phase tester has outputs of either 20 amp at 100v or 25 amp at 80v for general relay testing. For current transformer testing, output is 200 amp at 10v.

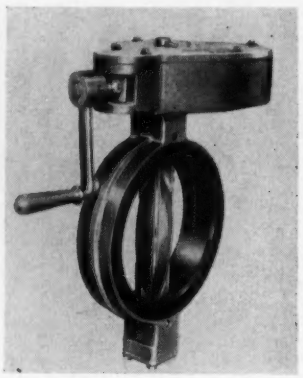
Six amp at 24v AC is the output for differential relay testing, and 4 amp at 8v DC is for target and seal-in relay testing. For insulation testing, output is 10 megaohms at 1200-volt rms through 250,000 ohms.

While the above is for continuous duty, overloads up to 500% for 3 seconds may be utilized. All outputs are continuously variable from zero to maximum values.

Timer measures from 0.01 to 60 seconds.

The tester is enclosed in a steel case mounted on casters and is provided with handles. Dimensions are: 19" high, 15½" deep, and 26½" wide. It weighs approximately one hundred pounds.

(Model IDR-35/MT-1 relay tester is product of MULTI-AMP Division of MULTI-AMP Electronic Corp., Dept. P&PSE, 465 Lehigh Ave., Union, N.J.)
Circle 9436 inside back cover.



Tight shutoff . . .

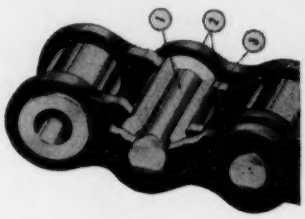
. . . at 150 psig is featured in line of high-pressure, rubber-seat butterfly valves in sizes 4" through 20". A wide range of material trim and valve actuators for manual or automatic operation is available.

(The Monoflange Mark II valves are manfactured by Henry Pratt Company, Dept. P&PSE, 319 W. Van Buren St., Chicago 7, Ill.)
Circle 9437 inside back cover.

Chain's built-in lubrication lasts a lifetime

Oil-impregnated, sintered steel bushings provide lifetime lubrication for chains eliminating the problem of faulty chain lubrication.

Pressure and heat cause built-in lubricant to expand and flow from bushings, providing a constant supply of lubricant to every working part of the chain. When drive stops, bushings re-absorb oil, assuring a permanent oil supply for the life of the chain.



Oil from bushings lubricates every working part of chain; is absorbed when drive stops

Design gives complete lubrication at three critical areas: 1) Pin — protective film of oil completely lubricates the live bearing area between pin and bushing.

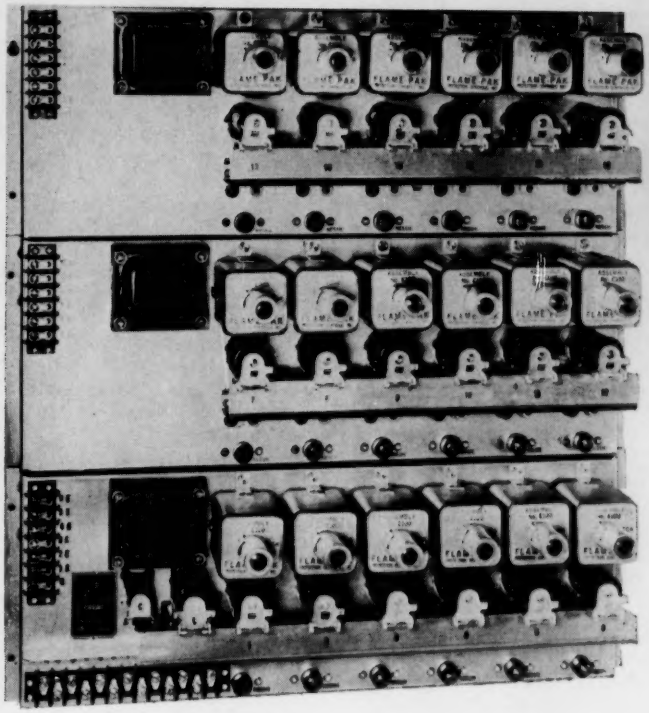
2) Plates — sintered steel bushings extend beyond surface of inside plates to act as lubricated thrust bearings, control clearance, and provide an oil-cushion between plates.

3) Sprocket engagement — oil film on exterior surface of the bushings provides constant lubrication between sprocket teeth and chain.

The chain does not require rollers, as the tough oil film on the bushing surface provides smooth sprocket engagement, cushions impact and reduces drive wear.

All essential dimensions of standard and extended pitch chain conform fully to ASA Standards.

(Whitney MSL Chain is product of Whitney Chain Company, a Subsidiary of Foote Bros. Gear & Machine Corporation, Dept. P&PSE, 303 West Hamilton St., Hartford 2, Conn.)
Circle 9438 inside back cover.



This open-type combustion safeguard (left) is for supervision of 18 burners from standard control panel. Enclosed type (top) can be mounted anywhere for any number of multi-burner installations

Gives continuous supervision of gas-operated burners

For continuous supervision of gas-operated burners in ovens, furnaces, boilers and other heating equipment, combustion safeguard control prevents fires or explosions from build-up of combustible fuel mixtures in either single or multi-burner installations.

A plug-in sub-assembly contains the entire electronic circuit (one for each burner). Any practical number can be used with a single unit to accommodate multi-burner installations.

If a flame failure or fault occurs at any burner position, the signal from the flame electrode to its corresponding circuit is interrupted. This immediately breaks the circuit to the safety shut-off valve, and stops fuel flow to all burners in the system.

Electrodes can be immersed through the center of the flame without causing unstable operation. This also permits use of a single electrode as both the igniter and the flame-sensing unit.

Special flame cable is not required since ordinary wire installed in conduit with other flame wires, and control or power wiring, for lengths up to 300 ft, does not cause any operating difficulties.

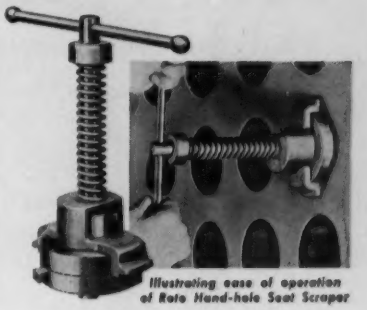
Another development is a signal device that reduces downtime when flame failure or fault occurs. This device provides direct-reading numerical indication of the faulty burner position.

The unit can be mounted in a special enclosure, in a control panel, or remotely in a separate enclosure.

("Protectofier" is manufactured by Protection Controls, Inc., Dept. P&PSE, 6000 N. Legett Ave., Chicago 46, Ill.) Circle 9439 inside back cover.

ROTO®

Hand-hole Seat Scraper



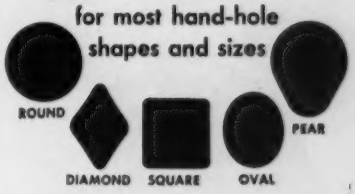
Illustrating ease of operation of Roto Hand-hole Seat Scraper

Eliminates tedious labor
Assures clean, tight fit

Roto Hand-hole Seat Scraper makes short work of cleaning dirty hand-hole seats. This simple, hand-operated tool has adjustable, spring-mounted retractable knives. A few turns to the right remove foreign matter without cutting the metal. A half turn to the left releases the tool, and the job is done. Customers say that the Roto Seat Scraper does the job up to 12 times faster than by any other method. Try one and you'll wonder how you ever got along without it.

Send for details.

Now available
for most hand-hole shapes and sizes



Standard Roto Seat Scrapers are available for the following equipment. Special types made to order.

Type of Boiler	Opening
Babcock & Wilcox ⌀ 4"	Round
" " " ⌀41	Oval
" " " ⌀70	Round
" " ⌀48	Oval
" " ⌀40	Oval
" " ⌀24	Oval
" "	Oblong
Bros	Round
Casey Hedges	Oval
" "	Oval
Combustion Eng'g	Round
" "	Oval
Edgemoor	Oval
Erie City	Ellip
" "	Oblong
" "	Ellip
" "	Pear
Foster Wheeler	Oblong
" "	Oblong
" "	Ellip
Geary	Oblong

Type of Boiler	Opening
Heine	Round
"	Oval
International Boiler 2	Oblong
Keeler	Round
"	Round
"	Diamond
"	Diamond
Lasker	Oblong
Murray	Oval
"	Oblong
Oil City	Oval
" "	Oblong
Riley Stoker	Ellip
Springfield	Ellip
Union Iron Works	Pear
Henry Vogt	Ellip
" "	Oval
Walsh & Weidner	Oval
Wickes	Ellip
"	Ellip
"	Pear
"	Round

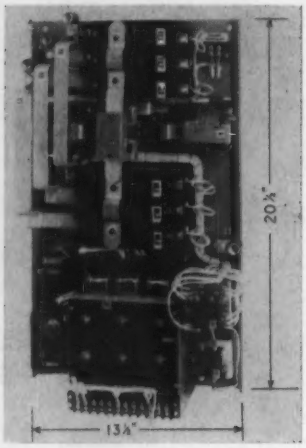
ELLIOTT COMPANY
ROTO PLANT
Tube Cleaner Specialists Since 1910

151 Sussex Avenue, Newark, N. J.

Circle 9440 inside back cover.

Automatic transfer switch rated 600v, 100 amps

Employing a dual circuit-breaker design that utilizes two opposing solenoids through a common transfer linkage for transfer power, automatic transfer switch is available to 600 volts AC and 250 volts DC, 100 amps, with interrupting capacities to 10,000 ampere rms.



Transfer switch uses two opposing solenoids

The two-position switch provides automatic transfer of power and light service to an emergency source in the event of failure of the normal source with the load automatically returned upon normal restoration.

The switch is operated by power from the side to which the load is transferred. The actuated solenoid throws a mechanically interlocked transfer bar, opening one breaker while closing the other.

When again actuated, the second solenoid returns the bar, restoring the breakers to their original positions. Giving positive snap action, the switch is electrically operated and mechanically held with no neutral position possible.

Three basic circuits available include total failure protection with transfer initiated upon complete failure of normal; 3-phase, 3-wire partial failure protection with transfer made when power drops below 70% of normal in any or all legs.

This is adaptable for 3-wire, 3-phase transfer to two-wire, single-phase emergency. Also provided is partial phase failure protection.

Optional features include adjustable time delay on restoration to normal to 30 minutes, engine starting contacts, pilot lights, test pushbutton, and special NEMA enclosures.

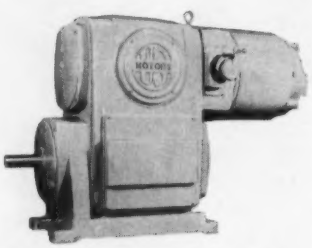
The unit, including required relays, measures 20½" by 13½" by 6".

(T-100A automatic transfer switch is manufactured by Lake Shore Electric Corp., Dept. P&PSE, Bedford, Ohio.)
Circle 9441 inside back cover.

Variable-speed drive at 30 to 60 hp

Two models of variable speed transmission and integral motor offer a rugged and compact design for ratings between 30 and 60 hp.

Model 65 is a single-belt drive rated to 40 hp with up to 6:1 speed variations. Capable of 60 hp, the Model 70 has dual belts and is also available with up to 6:1 speed variations.



Speed variations are up to 6:1

Both models feature sturdy sub-base construction to permit upright or horizontal mounting and allow application in confined locations.

As optional equipment, a gear reducer can be integrally mounted for reduced speed, high torque applications.

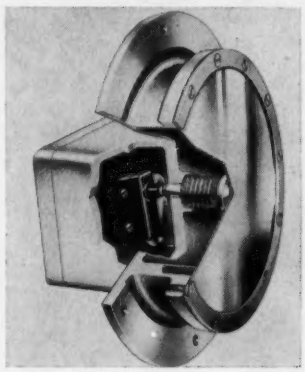
The units are available with a variety of remote controls.

(Varidrives are manufactured by U.S. Electrical Motors Inc., Dept. P&PSE, Box 2058 Terminal Annex, Los Angeles 54, California.)
Circle 9442 inside back cover.

Bin level indicator resists corrosion and erosion

Automatic bin level indicator is especially suited to applications where corrosion and chemical action may be factors, even when it is installed in a suspended central position in the bin, completely enveloped by material.

Offered in both standard and explosion-proof models,



Entire body is heavy aluminum castings

the highly sensitive device has an entire body of heavy aluminum castings and diaphragm of stainless steel.

The unit can be affixed to thick or thin walled bins, or suspended within the bin or hopper at any desired level through use of a simple extension. In operation, pressure of material against the diaphragm actuates a switch which operates signals such as lights, bells or horns.

It can also be used to automatically start or stop the flow of material into or out of the hopper and stop or start filling machinery.

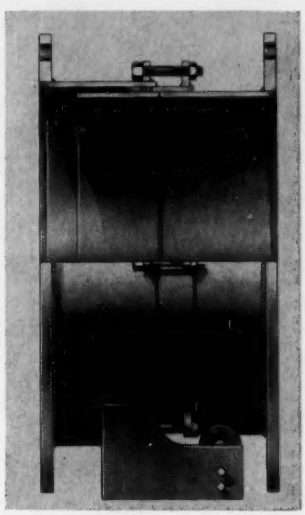
(Auto-Bin-Dicator is manufactured by Bin-Dicator Co., Dept. P&PSE, 13946 Kercheval, Detroit 15, Mich.)
Circle 9443 inside back cover.

Expansion joints are desiged for exhausts of large engines

A light-weight, high-temperature, low-pressure service expansion joint is designed for temperatures up to 1200°F and are especially recommended for use on turbo-charged and other large engine exhaust lines where back thrust of exhaust line presents costly and time-consuming maintenance due to thermal expansion.

The joint embodies a packed slip joint which has a stainless steel packing surface. The mounting base and adjustable centering roller support are an integral part of the unit and remove the weight of the slip joint from the surrounding packing and gland.

Packing is uniformly compressed throughout the full 360° of slip joint and wears evenly at all points. The non-corroding stainless steel packing surface provides a permanently smooth surface and reduces both friction and wear.



Expansion joint has packed slip joint with stainless steel packing surface

The units have a three-inch traverse with 20-inch face-to-face maximum.

End thrust is minimized and constant throughout the traverse.

An example of their light weight for easy installing — the flanged 30-inch size weighs 600 lb.

(Expansion Joints are manufactured by KA-CY Manufacturing Co., Inc., Dept. P&PSE, Houston, Texas.)
Circle 9444 inside back cover.

Pipe-threading machine is mobile; die-heads are interchangeable

A complete mobile pipe- and bolt-threading machine will ream, thread and cut off all sizes of pipe from ⅛" to 2". It has a ½-hp universal, geared-head variable speed motor.

A wide choice of floating-type, adjustable die-heads are available — either radial or tangential type. Both are interchangeable on this machine.

Six different types of die-heads are available

Four types of radial heads available are: 1) "Quadversal Type" — designed for all right-hand threads within the range of the machine by changing dies and adjusting for the various sizes.

2) "Quadri Type" — designed to cut right-hand pipe threads from 1" to 2" without changing dies.

3) "Dual Type" — for threading smaller-size pipe from ⅛" to ¾".

4) "Mono Type" — designed for all pipe and bolt sizes within the range of the machine, graduated and set for one size only.

There are two tangential heads available for highly precisional threading of stainless steel and other "hard-to-thread" material. One type threads ⅛" to ¾" pipe, and the other handles 1" to 2" pipe.

Other features include wrenchless front and rear chucks with neoprene handwheel rims (impervious to oil) to facilitate opening and closing. Front chuck is equipped with self-energizing jaws which insure positive gripping on all kinds of stock for both right and left hand operation.

Flow of coolant is controlled by moving oil valve to right or left. Valve is conveniently located on the operator's side.

(Oster "552" is product of The Oster Manufacturing Co., Dept. P&PSE, 1340 East 289th St., Wickliffe, Ohio.)
Circle 9445 inside back cover.

Rubber piping connectors for temp to 250°F, pressure to 250 psi

Complete line of all-purpose flexible rubber piping connectors have been developed for use in controlling water line noises, eliminating equipment vibration, reducing water hammer, simplifying alignment problems, and minimizing strain on piping.

Constructed of a rubber liner, several layers of multiple-ply rubber and fabric, wire reinforcing, another layer of rubber and fabric, and an outer wrap, connectors provide resistance to chemical action and abrasion and withstand temperatures to 250°F and pressures to 250 psi.

The light-weight, flexible sections have an acoustical impedance 550 times less than the impedance of steel pipe, and will attenuate up to 90% of vibration and noise, depending upon length. Some applications include isolating pipe lines from vibration of compressors, condensing units, water chillers, cooling towers, air handling units, and vacuum service.

Available with integral full-faced rubber and duck flanges — or with male or female standard iron-pipe thread, brass-fitted couplings, the sections come in nine standard pipe sizes from 2½" to 12". Standard lengths range from 24" to 60".

Sections with brass couplings are available in eight pipe sizes from ¾" to 4"; standard lengths from 12" to 36".

(Rubber piping connectors are available from The Korfund Company, Inc., Dept. P&PSE, 48-48F 32nd Pl., Long Island City 1, N.Y.)
Circle 9446 inside back cover.

Inspection light and view port has many uses

Consisting of a heavy-duty lamp, heat-resistant, explosion- and dust-proof inspection light with view port can be inserted into the outside casing or housing of any equipment such as boilers, ovens, dryers, dust collectors, hoppers, air filters, or belt conveyors.

Both light and view port are designed for temp to 500°F

The vibration-proof lamp is attached to the inner side of the casing and to an aluminum frame. Both the light and view port are made for temperatures up to 500°F.

Burned-out bulbs can be changed from outside without interference to operation of equipment. Both units require only 8¾" diameter opening for mounting.

(Inspection light and view port are products of Robert H. Wager Co., Dept. 22, South Orange, N.J.)
Circle 9447 inside back cover.

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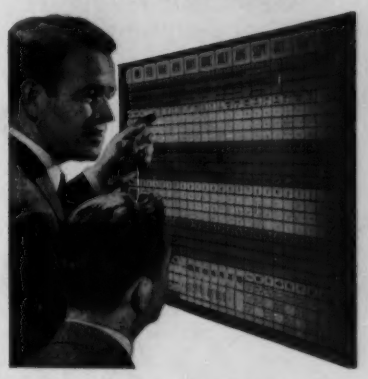

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Counterpoise pipe hanger fits congested areas

All main load-carrying parts in line of counterpoise pipe hangers are located at one end of the structure, which simplifies the design of the loaded parts and permits installation of the hanger in congested locations.

The hangers are designed to provide constant load-supporting capacity for piping systems subject to expansion and contraction due to temperature changes. Basically spring-actuated counterbalances, they produce a constant supporting effect on loads which travel in vertical directions, and are applicable to piping system movement requiring flexible support.

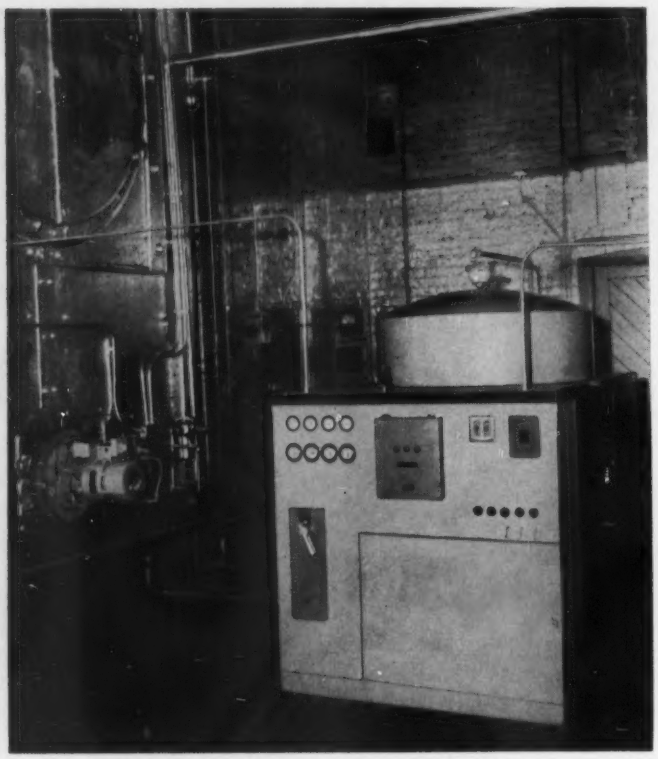
The over-hanging spring assembly can also be revolved at any angle about the load and support rods, giving additional installation flexibility. Top connections are provided with an appreciable angularity of load movement.

Vertical distance between support and load connections is as short as possible, permitting installations where headroom is limited. In case of extreme headroom limitation, the turnbuckle and providing rod adjustment at the end of the support or load rods can be eliminated.

Four basic types are available in a wide variety of sizes: single and double suspension models, a vertical model (where space limitations make it difficult to use hangers with the spring assembly in the horizontal position), and a junior model for auxiliary and intermediate service piping.

Custom-built models are also available.

(Counterpoise Constant Support Hangers are manufactured by Fee & Mason Mfg. Co., Dept. P&PSE, Manasquan, N.J.)
Circle 9449 inside back cover.



Actual tests have shown filtering system to save on fuel, chemical treatment, blowdown and condensate losses

Sample on right shows effectiveness of system as compared with sample of treated water from well-maintained industrial-plant boiler

Automatic boiler water control system keeps water clear of solids, sludge

Unit is equipped with analyzing, sensing and safety controls

Available in standardized models for all types of steam boilers up to 1000 hp and in customized units for boilers to 6000 hp, low-cost, side-stream boiler-water control system continuously and automatically keeps boiler water crystal clear by eliminating sludge and suspended solids.

Reports on two boilers side-by-side show that the system can save up to 20% on fuel consumption, up to 75% on treatment chemicals, up to 75% on blowdown heat and water losses and up to 100% on contaminated condensate losses over normal treatment program.

The system is based on continuously recirculating boiler water through an effective side-stream filter and filter pre-coat that reduces suspended solids to a value close to zero. The completely automated units also combine side-stream filtration with chemical pretreatment, internal treatment, continuous minimum blowdown and feedwater preheating and degassing within the system.

Equipped with analyzing and sensing devices, safety and operating controls, the systems can be integrated with existing pretreatment systems and are adaptable to handle internal treatment chemical. The unitized systems are pre-engineered and delivered as a complete package for quick, space-saving installations in boiler rooms.

(Automatic Side-Stream Boiler Water Control System is development of Sparkler-Filtrion Corporation, Dept. P&PSE, North Chicago, Ill.)
Circle 9450 inside back cover.

Improves dry bearing operation

Improved dry bearing operation comes with the development of thrust washers manufactured from a dry bearing material developed in England.

The patented composite material consists of a steel backing with a thin, sintered, porous bronze-powder-filled Teflon resin. Teflon is anti-adhesive in nature and capable of withstanding temperatures from −328°F to 536°F.

Thrust washer for dry bearing operation consists of lead- and bronze-filled Teflon

The bore diameter of the thrust washers is substantially larger (approximately 1/16″) than the journal diameter in which they are mounted. This is done so that the washer may be a loose fit in the housing recess.

A dowel hole is provided in each washer to receive a loose-fittings dowel which is satisfactory for journals rotating in one direction. With an oscillating journal, a fitted dowel or set screw is required to prevent all washer movement.

The dry bearing material exhibits excellent wear characteristics. During the break-in period, a thin surface layer of lead-filled Teflon from the bearing surface deposits on the mating surface.

After this layer is transferred, local frictional heat resulting from high point bronze contact with the mating surface causes lead-filled Teflon to exude from the pores of the bearing onto the bronzed surface creating a bearing condition of two mated, lead-filled Teflon, self-healing surfaces.

(DU dry bearing material is marketed by United States Gasket Company, Plastics Division of The Garlock Packing Company, Dept. P&PSE, Camden 1, N.J.)
Circle 9451 inside back cover.

Quick-opening valve handles water, oil, low-pressure steam

A bronze quick-opening gate valve has been redesigned and is especially recommended for installations where quick operation is required to handle water, oil, gas and steam.

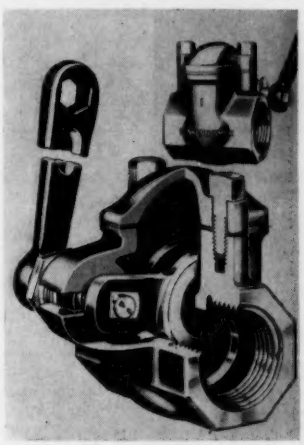
The valve provides tight shut-off against flow from either direction and features a ball-and-socket joint between self-adjusting disc faces, and accurate guiding for pressure-tight seating.

Deep stuffing box effectively seals operating stem while permitting easy operation.

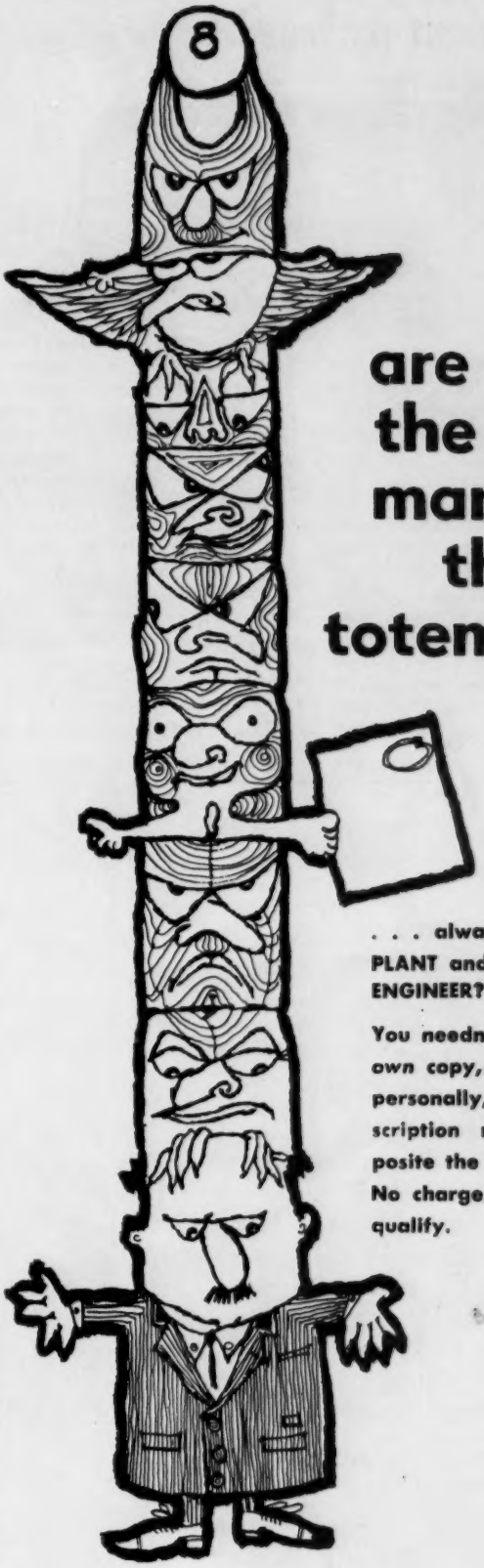
End-to-end dimensions are unchanged, thus maintaining the valve's interchangeability. Cap is bolted down with two cap screws, making disassembly and reassembly faster and simpler.

Available in sizes ½″ through 4″, valves are rated 75 psig.

(Fig. 430-58 valves are manufactured by Lunkenheimer Company, Dept. P&PSE, Cincinnati 14, Ohio.)
Circle 9452 inside back cover.



Gate valves feature tight shut-off



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Forced-draft packaged boilers need only service connections

Featuring forced-draft firing, line of packaged boilers covers a range of SBI ratings (steam) from 1010 to 5620 sq ft and water from 243 to 1350 mbh. The forced-draft burner fires natural, mixed or LP gas, No. 1 or No. 2 fuel oil or combination gas and oil. Burner and all controls are installed and wired at the factory.

Only service connections are required to complete the boiler installation.

Unit can be moved into position on a lift truck or by other conventional methods and placed in operation within a few hours. The refractory-filled base has steel skids for easy handling.

The front-mounted control panel provides a selector switch for instant fuel change-over on combination gas and oil units. In addition to conventional safety controls, an air-flow safety switch delays firing until the forced-draft blower is operating at correct speed.

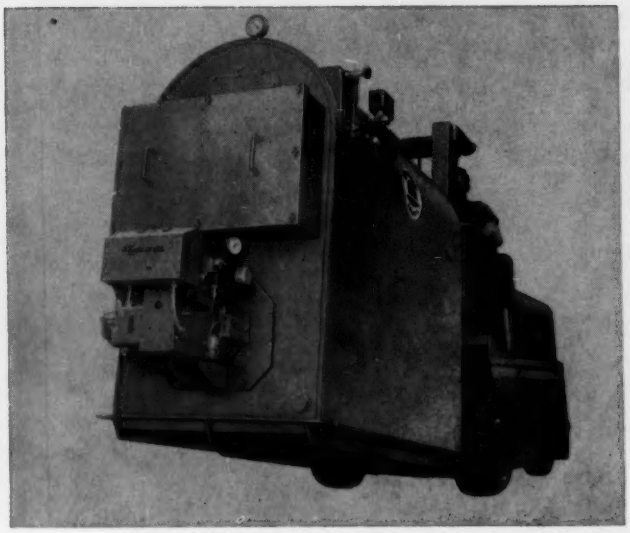
An insulated wrap-around jacket of heavy-guage steel is standard equipment. The ruggedness of this construction is such that crating of the entire unit for handling during shipping and installation is not required.

The steel smokebox has a rear outlet which is circular to fit standard-size smoke pipe.

The boiler does not require a stack — only a vent to remove products of combustion from the boiler room.

The insulated front flue door is pressure-tight. Designed for ease of removal, it is held in place by wing nuts.

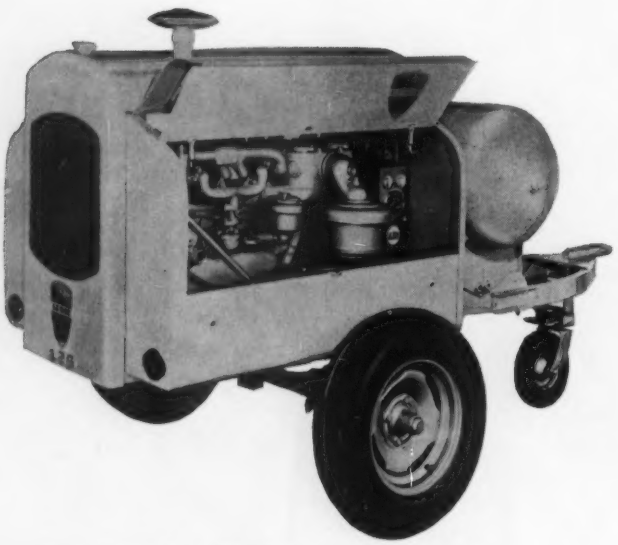
A hot water heating coil is available as optional equipment.



Packaged boiler can be moved into position by lift truck and placed into operation within a few hours

(Square-Heat Type RF boilers are products of Industrial Division, American-Standard, Dept. P&PSE, Detroit 32, Mich.)
Circle 9453 inside back cover.

Engine and compressor make up single mobile unit



Compressor produces 100 psi air at a rate of 125 cu ft per min

Single-stage, piston-type mobile air compressor powered by a gasoline engine has a 125 cfm capacity. The engine and compressor are built as one unit. Compressor produces 100 psi air, and its speed is rated at 1300 rpm.

An inexperienced operator can safely put the compressor to work by flipping the ignition switch and the starter switch. Cold weather starting is aided by a 12v electrical system.

Patented "Econotrol" varies engine speed according to air demand. All gages are grouped on panel with ignition and starter controls.

Both the overhead-valve 4-cylinder engine and the 2-cylinder compressor have replaceable wet-type cylinder sleeves. Because it has only one crankcase and one crankshaft, the need for a clutch or coupling is eliminated.

There is also only one pressure lubrication system. Use of an automotive replaceable-element oil filter makes changing easy and inexpensive.

Additional features include tool boxes which extend the full length of the lockable housing, all-welded steel frame, retractable caster wheel and a three-point suspension system that protects against towing distortion. Wheel bearings are tapered-roller type.

(125G1 mobile air compressor is product of Le Roi Division, Westinghouse Air Brake Company, Dept. P&PSE, Milwaukee 1, Wis.)
Circle 9454 inside back cover.

Hydraulic, pneumatic filters handle press to 1000 psi

Capable of operating at pressures to 1000 psi and temperatures to 275°F, line of filters are designed for use in pneumatic and hydraulic systems. Units provide effective filtration for such fluids as lubricating oils, ethylene glycol mixtures, hydraulic fluids (including mineral oil base, silicate esters, and diester oil base), fuels, oils, air and gases.

Various filtering media can be used

Any model in the series can be adapted for filtration of other types of fluids by simply changing to the proper gasket material. Design versatility permits use of replaceable paper elements, wire mesh, or varied-spacing metal-edge filtering media with degrees of filtration ranging from 2 to 25 microns.

Clamp lock-ring construction on the steel housing affords easy element change and replacement without disconnecting the filter.

All units are furnished with mounting brackets, inlet and outlet connections, and internal relief valves to insure bypass of fluids in case of stoppage.

Relief valve settings vary from 15-20 psi for lower differential pressures to 45-55 psi for higher pressures.

(P-192 filter series is available from Purolator Products, Inc., Dept. P&PSE, Rahway, New Jersey.)

Circle 9455 inside back cover.

Protects elect. equipment against overload

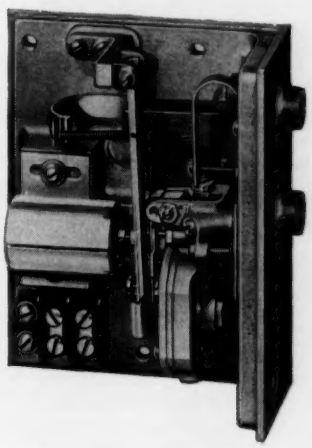
Positive protection against overloading of motors is provided by a relay designed for use with pneumatic control systems. The unit can be applied to all makes of centrifugal refrigeration compressors and to fans, pumps, and electrical heating systems.

The relay consists of an electrical element, a direct-acting proportional-action pneumatic relay, and a feedback element.

The device can be adjusted for any current between 3 and 7 amps. Since it is used with motors having many times this current rating, a current transformer is used to provide a current within these limits.

For centrifugal compressor applications, the relay is connected in the control line to the suction damper operator.

Most centrifugal compressors have a tendency to deliver more than 100 percent of their rated capacity after overnight or prolonged shutdown or under certain conditions when the cooling load on the building is greater than refrigeration capacity. The device will eliminate risk of damage in these instances.



Relay can be used on fans, pumps, electrical heating systems, and centrifugal compressors

(V-26 Load Limiting Relay is manufactured by Johnson Service Company, Dept. P&PSE, Milwaukee 1, Wis.)

Circle 9456 inside back cover.

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Reviews of books and industrial bulletins describing equipment supplies, services

Accurate worm gear selection given

Providing basic data needed for accurate selection of worm gear sets, 24-page catalog is fully illustrated with explanatory drawings and contains basic information as well as selection data.

Opening sections provide design data and information on the special features of worm gearing, how to select it, and how to calculate bearing loads.

Subsequent sections give information on standard design worm gears, single- and double-extended worm and mounting, and single- and double-extended worm shaft.

("Delroyd" catalog is issued by De Laval Steam Turbine Co., Dept. P&PSE, Trenton 2, New Jersey.)
Circle 9457 inside back cover.

High-voltage fuses explained

High-voltage current-limiting fuses for protecting potential transformers, small service transformers, control transformers and auxiliary power transformers are described in four-page bulletin.

The fuses, designed for indoor use, expel no conducting gases. Operating voltages range from 120v to 14.4kv with interrupting ratings to 130,000 amp rms asymmetrical.

The bulletin describes the devices' operation under low and heavy faults, gives complete ratings and dimensions, and explains universal application.

(Bulletin 281 is issued by S&C Electric Company, Dept. P&PSE, 4435 Ravenswood Ave., Chicago, Ill.)
Circle 9458 inside back cover.

Footswitch features wide treadle

Information on a general-purpose footswitch that features an extra-wide treadle is contained in catalog sheet.

The seven-inch wide treadle covers the entire top of the switch unit offering a larger "target" area for the operator's foot.

("Clipper" footswitch bulletin is issued by Linemaster Switch Corporation, Dept. P&PSE, 432 Woodstock Terrace, Woodstock, Conn.)
Circle 9459 inside back cover.

Integral horsepower motors shown

Drip-proof, splash-proof, weather-proof integral-horsepower electric motors are illustrated in 4-page brochure. Ratings are from 10 to 150 horsepower.

The motors have cast iron brackets, stainless steel nameplate, cast iron conduit box, and "perma-guard" bearings.

(Brochure No. SB 186 is issued by Marathon Electric Manufacturing Co., Dept. P&PSE, Wausau, Wis.)
Circle 9460 inside back cover.

Air starting motor in bulletin

Air starting motors bulletin describes growing trend toward cranking internal combustion engines with air power.

Several case histories on air starting motor installations, as well as how to select proper air starting motor are included.

In addition, drawings show piping arrangements for each size and a suggested hook-up for using the motors on vehicles.

(Bulletin Form 509 4E is available from Ingersoll-Rand Co., Dept. P&PSE, 11 Broadway, New York 4, N.Y.)
Circle 9461 inside back cover.

Duct fans resist corrosion

Line of fiberglass belt-driven duct fans offer resistance to most corrosive elements common to industrial plants.

Two-page bulletin tells how propeller, duct section, drive housing and bearing cover are made of fiberglass and the drive shaft and hardware are made of stainless steel.

(Bulletin A-116 is issued by Hartzell Propeller Fan Company, Dept. P&PSE, Piqua, Ohio.)
Circle 9462 inside back cover.

Big pump catalog offers easy pickings

Weighing nearly three pounds, pump catalog contains 576 pages of engineering data arranged for convenient selection of pumping units and materials of construction to meet specific applications.

Many hundreds of pump types, models, and sizes with almost limitless capacities covering almost any head conditions are carried.

("Pic-A-Pump" catalog may be obtained by writing on your company's letterhead to Allis-Chalmers Manufacturing Company, Dept. P&PSE, Box 512, Milwaukee 1, Wis., or by request from Allis-Chalmers district offices or distributors.)
Circle 9463 inside back cover.

How fly ash handling problem was solved

How labor requirements were reduced and sanitary conditions improved at Commonwealth Edison's State Line Station by installation of a pneumatic conveying system to handle fly ash is related in four-page technical report.

Described are the storage and bagging facilities installed by the company to capitalize on the growing commercial market for fly ash.

Design and performance of the pneumatic system and component equipment is discussed in detail.

(Bulletin ER-49-2 is available from Fuller Company, Dept. P&PSE, Catasauqua, Pennsylvania.)
Circle 9464 inside back cover.

Temperature transmitter

For measuring temperature from 0 to 1200°F and transmitting pneumatically to indicating, recording, and/or controlling equipment at remote station, specification sheet describes helium gas-filled system.

Operating characteristics and installation requirements are listed as well as standard ranges and accessories.

(Specification P51-4 is issued by Bailey Meter Co., Dept. P&PSE, 1050 Ivanhoe Road, Cleveland 10, Ohio.)
Circle 9465 inside back cover.

Pocket-size data on chain drives

Presenting the do's and don'ts the experts follow, pocket-size handbook outlines installation, operation and maintenance procedures for chain drives.

The bulletin contains up-to-date, practical information on how to install, operate, maintain and extend the life of your chain drives.

(Bulletin 59126 is issued by Chain Belt Company, Dept. P&PSE, Milwaukee 1, Wis.)
Circle 9466 inside back cover.

Submersible pump has motor at bottom

Submersible pump differs from conventional units in that its motor is on the bottom end of the shaft submerged into a well, rather than above surface.

Sixteen-page bulletin tells how the units are primarily designed for use with deep settings and high heads. The motor location makes the pump suitable for applications where noise from surface units would be objectionable.

(Bulletin 2400-B1 is issued by Worthington Corporation, Dept. P&PSE, Harrison, N. J.)
Circle 9467 inside back cover.

Pressure measurer transmits data

A precision pressure measuring instrument is suitable for transmitting proportional analog or digital signals to remote indicators, recorders, controllers and data handling equipment.

Four-page bulletin gives all details in handy chart form.

(Specification Bulletin 11-1221-2 is issued by Fischer & Porter Company, Dept. P&-PSE, 216 Jacksonville Rd., Hatboro, Pa.)
Circle 9468 inside back cover.

Shows air cylinder accessories

Two accessories for line of air cylinders are introduced in two-page bulletin.

The first item is an accessory pin which can be provided at either end of any cylinder and which has a throw of 0.062".

The second item is a bleeder valve which can also be provided at either end of any cylinder and whose function is to bleed air from another piece of equipment as the rod on the cylinder reaches the end of its stroke.

(Form No. 70-VR is available from Allenair Corp., Dept. P&PSE, 255 East Second St., Mineola, N.Y.)
Circle 9469 inside back cover.

How to stop rust with paint

Containing a full listing of product features, bulletin describes anti-rust paint which provides complete coverage in one coat without use of primer.

The paint is suitable for all metal application indoors or out. It comes in clear and seven colors.

(Bulletin RAR-2 is issued by Speco, Inc., Dept. P&PSE, 7308 Associate Ave., Cleveland 9, Ohio.)
Circle 9470 inside back cover.

Shows photos of basic variable-speed drives

Eight-page, illustrated bulletin shows basic types of variable-speed drives in manufacturer's line.

A large variety of modifications, including a separate motor-drive horizontal assembly and a shaft-mounted right-angle drive, are also pictured.

Suggested applications, and detailed information regarding horsepower, duty, speed variation, mounting styles, enclosures, and electrical characteristics are also included.

(Bulletin No. 195 is available from Sterling Electric Motors, Inc., Dept. P&PSE, 5401 Telegraph Rd., Los Angeles 22, Calif.)
Circle 9471 inside back cover.

Pneumatic, hydraulic tubing explained

Flexible tubing for hydraulic and pneumatic applications is subject of a combination bulletin and price list.

In addition to outlining the general characteristics, the bulletin lists complete specification data. A chart gives the chemical resistance of the tubing to about 150 chemicals in widespread use.

(Bulletin 1 is available from Synflex Products Division, Samuel Moore & Co., Dept. P&PSE, Mantua, Ohio.)
Circle 9472 inside back cover.

Small variable transformer colorfully explained

Featuring a 40% increase in rating with no increase in size, small variable transformers are designed for variable AC voltage applications having relatively low wattage requirements.

Eight-page bulletin presents many colorful illustrations and charts explaining the operation of these units, whose terminals are designed to permit use of push-on connectors, soldered connections or both.

(Bulletin P159 is issued by The Superior Electric Company, Dept. 10B, 83 Laurel St., Bristol, Conn.)
Circle 9473 inside back cover.

How to control scale and corrosion

"Solution to Your Problem of Scale and Corrosion Control" is subject of 16-page circular which is in the form of a telescoped sheet of drums.

Each page or "drum" features a chemical material directed to some special use in correcting and controlling scale and corrosion factors.

(Glucosate circular is issued by D. W. Haering & Co., Inc., Dept. P&PSE, PO Box 1033, San Antonio 21, Texas.)
Circle 9474 inside back cover.

Protective coating resists abrasion

A diamond-hard "baked-like" finish that is resistant to wear for floors, walls and machinery especially in food and dairy plants, canneries, breweries, refineries, chemical and plating plants is described in 4-page brochure.

The product is said to have outstanding resistance to abrasion, chemicals, acids, soaps, oils, detergents, solvents, greases, alkalis, and caustics.

(Brochure is available from The Garland Co., Dept. P&-PSE, 3748 East 91 St., Cleveland 5, Ohio.)
Circle 9475 inside back cover.

Fan motor bulletin

Four-page bulletin describes fan motors designed for operation in ventilating systems, exhaust systems, cooling towers and all air-moving installations where a motor drives a propeller or axial flow fan.

Application data to determine the motor horsepower rating required in an installation for various air velocities across the motor are given. Motor design utilizes air circulated in these installations to cool the motor for maximum horsepower with minimum motor size.

Horsepower ratings are 1 to 125.

(Bulletin 2950 is issued by Louis Allis Co., Dept. P&PSE, 427 E. Stewart Street, Milwaukee 1, Wis.)
Circle 9476 inside back cover.

For more information on items reported in the New Literature section circle corresponding numbers on reader service card inside back cover.

HTHW case history

How Personal Products Corp., modified its high-pressure hot-water generating plant to enable it to produce both steam and high-pressure hot water is subject of four-page reprint of technical article.

The article gives information on alterations to present equipment, equipment additions, and changes in piping systems to improve parallel operation of the boilers.

A schematic drawing diagrams the system, and photographs picture principal components.

(Four-page reprint is available from J. O. Ross Engineering Division of Midland-Ross Corporation, Dept. P&PSE, 730 Third Ave., New York 17, N.Y.)
Circle 9477 inside back cover.

Have corrosive locations? Here's fixtures to use

Which material for "Conduulet" electrical fixtures should be used for which corrosive atmosphere?

This is the subject of a 16-page bulletin which presents numerous tables of corrosive substances together with the metals and alloys to be used in electrical fixtures for these locations.

The booklet also contains first formal listings of a plastic coated fixture for hazardous and non-hazardous locations.

(Bulletin 2699 is available from Crouse-Hinds Co., Dept. P&PSE, Syracuse 1, N.Y.)
Circle 9478 inside back cover.

Two compressed air filters are shown

The "Condensifilter" — a combination condenser, separator and filter — removes both entrained and vaporized moisture and oil from compressed air lines.

Four-page bulletin discusses two models in the line and tells how they both incorporate an internal trap. Specifications and cross-sectional drawings are included.

(Bulletin 4158 is issued by Hankison Corporation, Dept. P&PSE, College & Pike, Canonsburg, Pa.)
Circle 9479 inside back cover.

Meter guide

Up-to-date information on line of single-phase and polyphase watthour meters, watthour demand meters, meter sockets, and water-heater time switches is contained in 64-page bulletin.

Featured is a quick-reference selection guide on "Standard Meter Applications" and an index which provides references to proper mounting equipment.

(Bulletin GEC-1400B is available from General Electric Company, Dept. P&PSE, Schenectady 5, N.Y.)
Circle 9480 inside back cover.

All about fluids

"Fluidics" — the science of fluid processes — is fully explained in 16-page bulletin.

Of interest to companies who handle or process liquids or gases, bulletin discusses specialized materials and equipment for handling and processing these fluids. Pertinent applications range from reactions to storage, from water treatment to waste treatment, from design and development to project engineering.

Each section is illustrated with application photos and presents concise engineering data.

(Bulletin 980 is available from Pfaudler Division of Pfaudler Permutit Inc., Dept. P&PSE, 1094 West Avenue, Rochester, N. Y.)
Circle 9481 inside back cover.

Mercury relay is faster

Mercury relay having a plunger bearing surface of Teflon, which because of its extremely low coefficient of friction assures swifter, more silent operation and longer life, is described and illustrated in four-page bulletin.

Photos and diagrams illustrate the relay's construction including: a heavy glass tube which hermetically seals plunger unit; mercury-to-mercury make and break; heavy tungsten contacts in inert gas to eliminate exposed arcs; dust- and moisture-proof construction; and protected coil.

(Bulletin 410 is issued by Mack Electric Devices, Inc., Dept. P&PSE, Wyncote, Pa.)
Circle 9482 inside back cover.

"You advertised for solar power research experts?"

Describes mobile unit for CO_2 welding

Serving as an instruction manual, four-page bulletin describes simple, mobile equipment with non-electronic controls needed for CO_2 semi-automatic and automatic welding of mild and low alloy steels.

The process is shown in use by means of a picture of the unit and a diagrammatic sketch of the hook-up.

(Form 55915 is issued by Arcos Corporation, Dept. P&PSE, 1500 South 50th St., Philadelphia 43, Pa.)
Circle 9483 inside back cover.

Wiring system standards for industry

Informative data on "Wiring and Wiring System Standards for Industrial Use" is presented in four-page bulletin.

The bulletin, a reprint of a technical paper, features sections on automation, conduit systems, troughs, trays, ladders, bus ducts and other products and wiring methods, as well as illustrative table and a bibliography on the subject.

(Technical Bulletin RCT-102 is issued by Rome Cable Corporation, Dept. P&PSE, Rome, New York.)
Circle 9484 inside back cover.

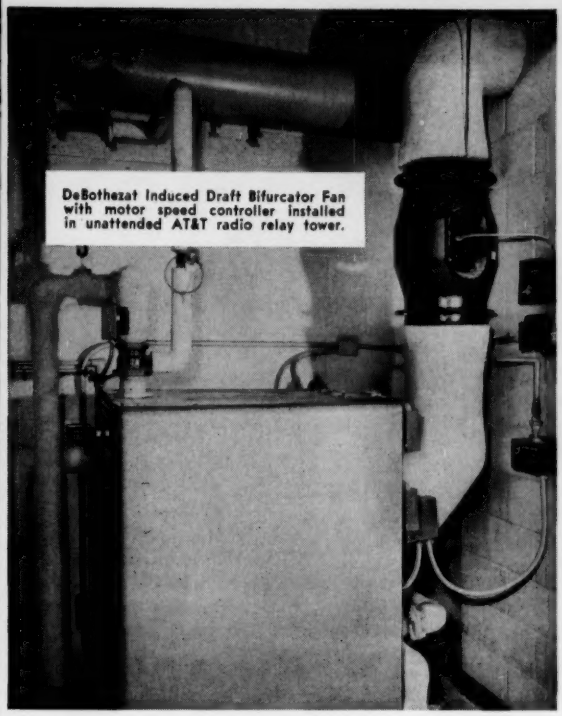
Dust collector details given

Cutaway diagrams and schematic drawings illustrate the technical explanation of a dry centrifugal dust collector in eight-page bulletin.

The units range from 3-cell units (9000 cfm) to 24-cell units (72,000 cfm).

A revised dimensions chart is included, along with an explanation of the unit's secondary air circuit and a listing of some typical installations.

(Bulletin 291A is issued by American Air Filter Co., Inc., Dept. P&PSE, 215 Central Ave., Louisville 8, Ky.)
Circle 9485 inside back cover.



THIS IS WHERE
dependability counts
for Induced Draft Fan

This installation of a DeBothezat Induced Draft Bifurcator® is typical of numerous others in unattended radio relay towers of the American Telephone and Telegraph Company. A dependable, controlled draft helps maintain correct temperatures that safeguard the performance of sensitive electronic equipment.

This Induced Draft Fan utilizes a direct motor drive which eliminates any chance for belt failure. The fan motor mounts in a separate insulated chamber and hot flue gases are bypassed around it.

DeBothezat Induced Draft Bifurcator Fans install just like a section of breeching or duct-work. This saves on space and installation costs. Bifurcators can be equipped with motor speed controllers which regulate draft according to exact boiler requirements. For more details, see our section in Sweet's Plant Engineering File . . . or write.

FOR FURTHER INFORMATION SEE OUR CATALOG IN SWEET'S PLANT ENGINEERING FILE OR WRITE FOR COPY

De Bothezat™ FANS
A DIVISION OF
American Machine and Metals, Inc.
EAST MOLINE, ILLINOIS
IN CANADA: Represented by DOUGLAS ENGINEERING CO., LTD., Toronto • Montreal

Circle 9486 inside back cover.

CUT HERE AND FILE

Plant Power Services Engineer — nomograph — 33

boiler capacity

RALPH E. FEHR II
Reading, Pa.

This nomograph affords an accurate and rapid method of determining the boiler capacity needed under certain performance conditions. It has been designed for small industrial applications where saturated steam or a low degree of superheat steam is used, and is based on the equation[1]:

$$\text{Boiler Capacity} = \frac{W(h_g - h_f)}{1000}$$

where

B = Boiler capcity, kilo Btu/hr
W = lb of water per hr
h_g = enthalpy of steam, Btu/lb
h_f = enthalpy of water, Btu/lb

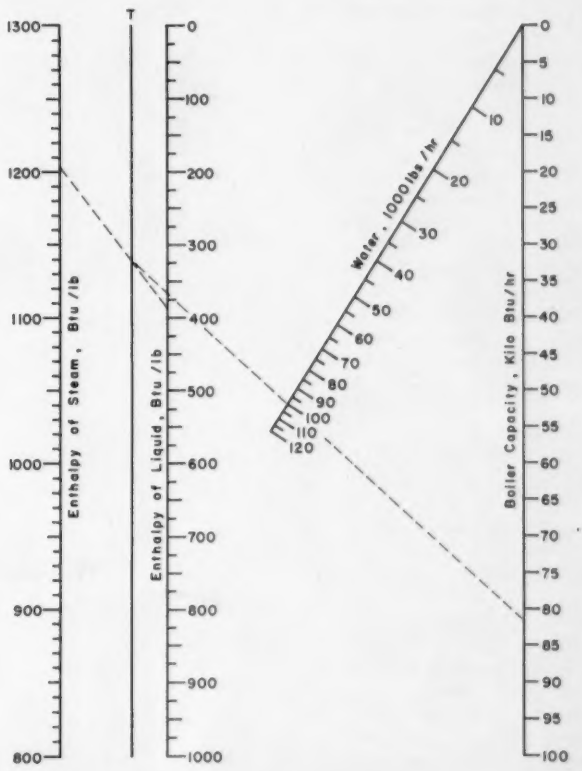
To operate the nomograph, connect the two enthalpy conditions desired by a straight line intersecting the turning axis, T; join this intersection point with the pounds of water needed and read the boiler capacity value intersected by this straight line.

Typical Example

The dashed index line on the chart shows that for an enthalpy of steam, h_g, of 1205 Btu/lb and a liquid enthalpy, h_f, of 391 Btu/lb, the boiler capacity is 81,400 kilo Btu/hr when using water at a rate of 100,000 lb per hr.

LITERATURE CITED:

1) CRANE CO., *Flow of Fluids*, Tech Paper No. 140, pp 4-18, Chicago (1957).



© Putman Publishing Company 1959

How to improve pipe welds

Two-page bulletin contains information and how-it-is-used illustrations on line of ceramic backing rings which withstand high arc temperatures and insure proper root fusion for improved pipe-welding.

("Pyrotone" bulletin is issued by General Ceramics Corp., Dept. P&PSE, Keasbey, New Jersey.)
Circle 9487 inside back cover.

Photoelectric controls in catalog

Controls for industrial counting, sorting, signaling, protecting, diverting, detecting or limiting job are described in 16-page bulletin.

Descriptions, specifications, and pricing data are given on self-contained relay, transistorized relay, high-speed relay, explosion-proof relay, long distance relay, smoke-density indicator, electronic timer, cut-off register control, side-register control and other electronic devices of these types.

The bulletin shows how these devices can be applied to simplify systems, reduce labor, cut waste while increasing the speed of the operation.

(Bulletin GEA-6822 is available from General Electric Company, Dept. P&PSE, Schenectady 5, New York.)
Circle 9488 inside back cover.

Plant cleanliness in case history

Plant cleanliness and greater employee safety are the results of using disposable paper wipers. Two-page report tells how user keeps machinery and equipment extra clean during all operations with the paper wipers.

(Form No. 1840 is issued by Industrial Packaged Products Div., Scott Paper Company, Dept. P&PSE, Front & Market Sts., Chester, Pa.)
Circle 9489 inside back cover.

Service line filters listed in bulletin

Detailed descriptions with dimensions of 66 filters with capacities up to 43 gpm for service up to 5000 psi at −65°F to 275°F are given in four-page bulletin.

These filters with cleanable, permanent high-dirt capacity, long-service, interval filter elements are recommended for hydraulic fluids, lubricating oils, fuels, and air.

(Bulletin A-1081 is issued by Aircraft Porous Media, Inc., Dept. P&PSE, 30 Sea Cliff Ave., Glen Cove, N.Y.)
Circle 9490 inside back cover.

Portable instrument tests oil circuit reclosers

Universal portable tester can be used for acceptance and installation as well as maintenance tests of oil circuit reclosers.

Electrical test objective, how the unit will aid recloser operation, how it works, and listings of the series and relayed types of reclosers are some of the subjects presented in the eight-page bulletin.

(Bulletin SB-OCR-1 is available from Multi-Amp Corporation, Dept. P&PSE, 465 Lehigh Ave., Union, N.J.)
Circle 9491 inside back cover.

"Chief, a man out here swears that you sent for him to demonstrate a waste disposal unit."

How to cut costs in waste disposal

Cutting of industrial waste disposal costs is theme of 12-page brochure describing a system that takes in refuse, garbage and paper waste, chews it instantly into finely ground, compacted pulp, renders it odorless without use of chemicals, and discharges it to containers for fast, easy disposal.

Case histories and installation photographs are presented. A step-by-step photo-diagram shows every stage of the system in operation.

(Form #66-5M-359 is issued by Wandel Machine Co., Inc., Dept. P&PSE, Pomeroy, Pa.)
Circle 9492 inside back cover.

Handy linear conversion table is on card

A linear conversion table is handy reference for converting inches and fractions of inches into decimal parts of a foot.

Table is suitable for many purposes in addition to its application to steel tubing.

(TDC 110 is available from Tubular Products division of The Babcock & Wilcox Company, Dept. P&PSE, 161 E. 42nd St., New York, N.Y.)
Circle 9493 inside back cover.

Shows control panels for water treatment

Illustrating modern water conditioning and ion exchange control assemblies, 12-page bulletin includes panels and cubicles.

Both conventional and graphic types containing centralized instrumentation for automatically controlling, recording, signalling and monitoring system operations are presented.

(Bulletin #4543 is issued by The Permutit Company, a division of Pfaudler Permutit Inc., Dept. P&PSE, 50 West 44th St., New York 36, N. Y.)
Circle 9494 inside back cover.

For Man-Cooling!

Coppus Airplane Type Heat Killer® **cools large areas — restores efficiency**

HEAT KILLER on the job in drop forge plant.

Steel mills, drop forge plants, foundries and other plants with hot working conditions find this Coppus Heat Killer increases worker efficiency . . . at reasonable cost. ***A single fan cools large areas.***

Other types also available for cooling furnaces, electrical equipment, for driving out gases, drying out products, drawing out fumes. Write now for detailed information. COPPUS ENGINEERING CORPORATION 189 PARK AVENUE. WORCESTER 2. MASSACHUSETTS.

ANOTHER COPPUS "BLUE RIBBON" PRODUCT

Circle 9495 inside back cover.

YOU CAN EARN 20 DOLLARS

BY HAVING A NOMOGRAPH IN

Plant and Power Services Engineer

PLANT and POWER SERVICES ENGINEER is looking for good nomographs designed to simplify calculations necessary to efficient plant and power services. If you have such a nomograph that has been helpful to you in your work — and it has not been published before — send it to:

Data Editor
PLANT and POWER SERVICES ENGINEER
111 E. Delaware Place
Chicago 11, Illinois

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Plant-Power Services Engineer **nomograph** 34

velocity of steam in pipes

R. L. PATTON
Supervisor, Equipment Design & Selection
Gulf Oil Corp., Port Arthur, Texas

As a quick method of determining steam velocity through pipes without the need of referring to a steam table, this nomograph is based on the equation:

$$V = 3.0558 \frac{W}{w d^2}$$

where

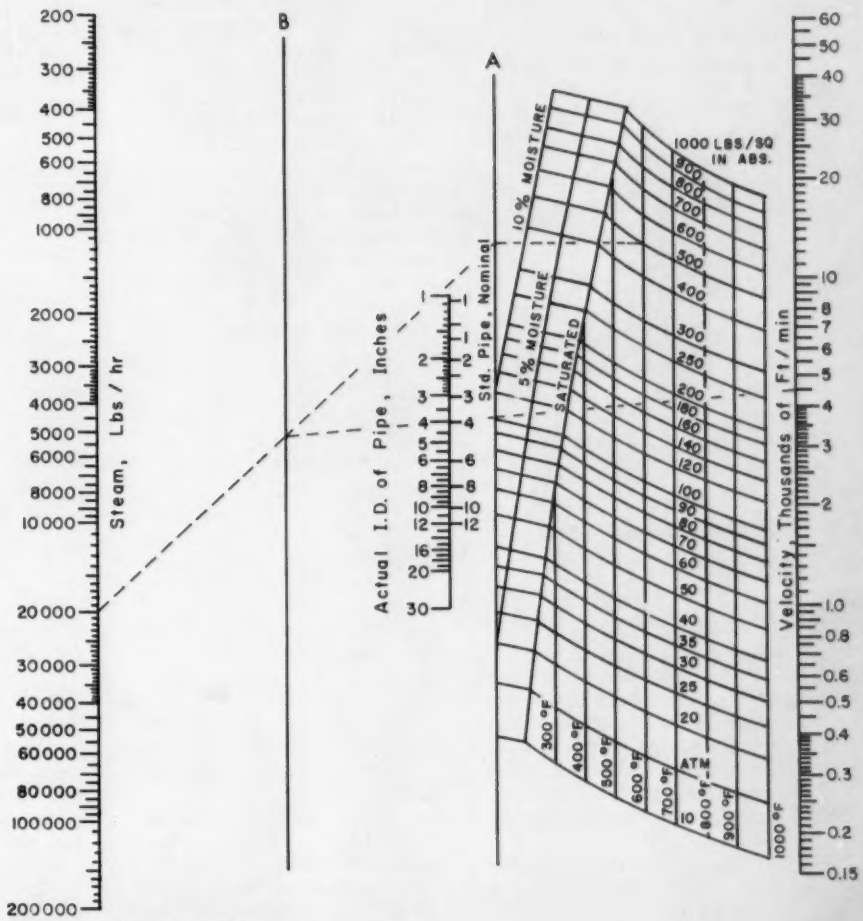
V = velocity, ft per min
W = steam flow, lb/hr
w = steam density, lb/cu ft
d = inside diameter of pipe, inches

To use the nomograph, draw a horizontal line from the point representing steam conditions to guide line (A) at the left. Connect this intersection with the steam flow in lb/hr.

A line drawn from this intersection on line B through actual ID of pipe gives velocity of steam.

Typical Example

The example shown by the dotted lines indicates that the velocity of steam at 20,000 lb/hr at 500 psia and 600°F through a 4" line is 4400 ft per minute.



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September, 1959

Concrete and masonry products

More than 36 products for concrete and masonry construction and building maintenance are described in new manual.

Formulations not available in the past include: concrete surface treatments; concrete integral mixtures; and waterproofing and damp-proofing compounds.

Manual includes data on formula of each product, where it may be used, its advantages, how it works, what it does and method or methods of application.

(Manual A.I.A. File Nos. 3-B, 4 and 7 is issued by Tretol Inc., Dept. P&PSE, 6531 West 63rd Street, Chicago 38, Ill.)
Circle 9496 inside back cover.

Includes many kinds bronze gate valves

Two-page circular illustrates and lists maintenance-saving features of many types of bronze gate valves.

Types included are screwed, solder or flange ends, ¼ to 3-inch sizes, rated at 125 lb SP, 200 lb WOG and 150 lb SP, 300 lb WOG.

(Circular No. 574 is available from Lunkenheimer Co., Dept. P&PSE, Cincinnati 14, Ohio.)
Circle 9497 inside back cover.

Explains double-retort underfeed stoker

Complete data are given on double-retort underfeed stoker in 8-page catalog.

Built for heavy-duty service in the intermediate size range for boilers of about 20,000 pounds to 34,000 pounds of steam per hour, the stoker burns nut, pea and slack or crushed run-of-mine bituminous coal.

(Catalog No. 401 is available from Detroit Stoker Company, Dept. P&PSE, Monroe, Mich.)
Circle 9498 inside back cover.

Recessed fluorescent lighting equipment

Twenty-page catalog details information on complete line of recessed fluorescent lighting equipment, including troffers, spot boxes, pattern lighting and plaster frames.

An index indicates the correct type of troffer for installation in any of 101 different ceiling systems.

(Form No. 221 "Smithcraft Recessed Fluorescent Lighting Equipment Price Catalog" is available from Smithcraft Lighting, Dept. P&PSE, Chelsea 50, Mass.)
Circle 9499 inside back cover.

Adjustable speed drives

Line of mechanical adjustable speed drives in horsepower ratings of ¼ to 25 hp is subject of 16-page bulletin.

The bulletin discusses principles of operation, configurations and features, and includes mounting positions, rating tables, and descriptions of available accessories.

(Bulletin GEA-6806 is issued by General Electric Company, Dept. P&PSE, Schenectady 5, N. Y.)
Circle 9500 inside back cover.

Gas regulators without gages

Line of industrial gas regulators without gages is described in two-page data sheet.

Complete specifications and operating data on the large-capacity, single-stage regulators are included.

The units are designed for use with oxygen, acetylene or propane on cylinders or manifolds.

(Form 1295 is available from Linde Company, Division of Union Carbide Corporation, Dept. P&PSE, Room 2840, 420 Lexington Ave., New York 17, N. Y.)
Circle 9501 inside back cover.

Indicators, controllers are self-balancing

Electronic self-balancing indicators and indicating controllers indicate any process variable convertible to an electrical quantity and may be connected to multi-point switches to check up to several hundred sensing elements.

In addition to primary indicating function, the instruments can be provided with two-position or three-position control, or with up to six alarm contacts.

The four-page bulletin contains illustrations showing the simplicity of design, the easily read 34″ scale, the quick-set control points and the double slidewires.

(Bulletin No. 65 is available from Thermo Electric Co., Inc., Dept. P&PSE, Saddle Brook, New Jersey.)
Circle 9502 inside back cover.

Expansion coils

Catalog illustrates and fully describes line of direct expansion coils and their "ripple fin" construction and gives comprehensive information on proper coil selection.

More than 20 pages are devoted to detailed temperature and altitude conversion, rating tables and psychromatic tables and charts for quick selection.

(Catalog 405 is available from McQuay, Inc., Dept. P&PSE, Minneapolis 13, Minn.)
Circle 9503 inside back cover.

Discusses principles of radiation pyrometry

Detailed information on improved radiation pyrometer is given in four-page bulletin along with technical information on the principles of radiation pyrometry, illustrations and application data.

(Catalog No. 105 is issued by The Pyrometer Instrument Co., Inc., Dept. P&PSE, Bergenfield, N. J.)
Circle 9504 inside back cover.

Welding machines for manual application

A new line of welding machines that can be used for all manual arc-welding applications are described in new 6-page bulletin.

Operating features, and construction details, are also given.

(Bulletin No. 4608 is issued by Lincoln Electric Co., Dept. P&PSE, Cleveland 17, Ohio.)
Circle 9505 inside back cover.

Combustion control for cyclone furnaces

Cyclone furnace-combustion control system is described in 4-page bulletin. Detailed descriptions of system operation and list of installations as well as diagrammatic and schematic drawings are included.

(Bulletin 514 is issued by Bailey Meter Company, Dept. P&PSE, 1050 Ivanhoe Road, Cleveland 10, Ohio.)
Circle 9506 inside back cover.

Simplifies selection of circuit breakers

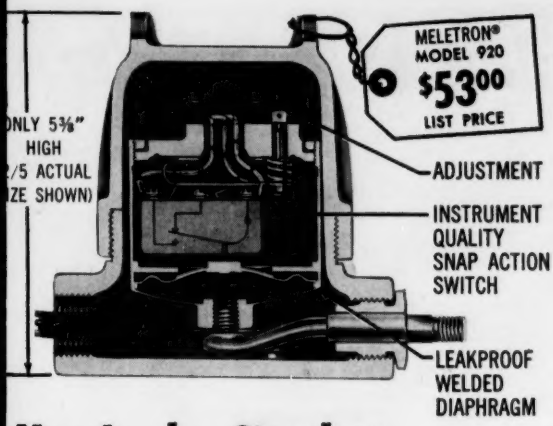
Eight-page bulletin is designed to aid in the selection of individually enclosed, low-voltage power circuit breakers.

The breakers — rated at 600v in 225 to 4000 amp frame sizes — provide service-entrance and single circuit control and protection for industrial plants, commercial buildings and power stations.

The bulletin contains a complete selection chart which details ratings, overcurrent devices and accessories available.

Charts giving complete application data, enclosure dimensions and coil types and ratings are also included.

(Bulletin S-4261-2B is issued by I-T-E Circuit Breaker Company, Dept. P&PSE, 1900 Hamilton St., Philadelphia 30, Pa.)
Circle 9507 inside back cover.



Here's the Simplest Diaphragm Pressure Switch for Explosive Atmospheres

WE BUILD IN	WE DON'T USE
EXTREME ACCURACY and DEPENDABILITY maintained during operating life due to direct acting design	LINKAGES & BEARINGS which, as they wear, make the setting of the pressure switch drift.
OPERATION IN ANY POSITION which saves the installation costs encountered in mounting a switch that uses liquid switching elements	LIQUID SWITCHING ELEMENTS which make the switch difficult to mount and very critical to vibration.
IMMUNITY TO VIBRATION you can mount the switch directly on your vibrating or moving equipment.	ACCORDION BELLOWS which make the pressure switch sensitive to vibration.

ASK FOR NEW CATALOG 9-PS FREE

PRESSURE SWITCH DIVISION

barksdale valves

5125 Alcoa Avenue, Los Angeles 58, California

Circle 9508 inside back cover.

CUT HERE AND FILE

Plant-Power Services Engineer

nomograph

Pressure conversion charts – II

Nomograph by Putman Staff

Although conversion of pressure into various units is a relatively simple operation, conversion of a large amount of data is sometimes tedious and prone to error.

This chart converts pressures from one set of common units to any or all of others.

The units in this case are: mm Hg, ft water, inches Hg, psia and psig.

To use the chart, simply place a straightedge so that it intersects the known value and lies across the center of the bull's-eye. Readings on all scales will then be equivalent.

Last month (page 45), a companion chart was presented. This chart contained the units: inches Hg, inches of water, ounces per square inch, and pounds per square inch.

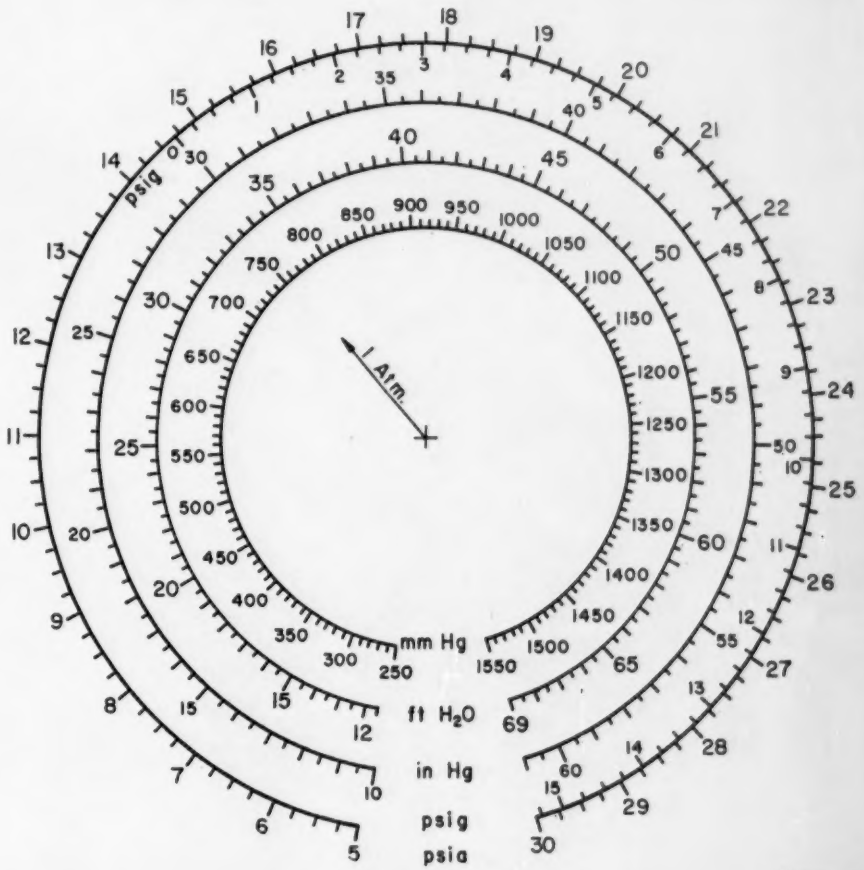
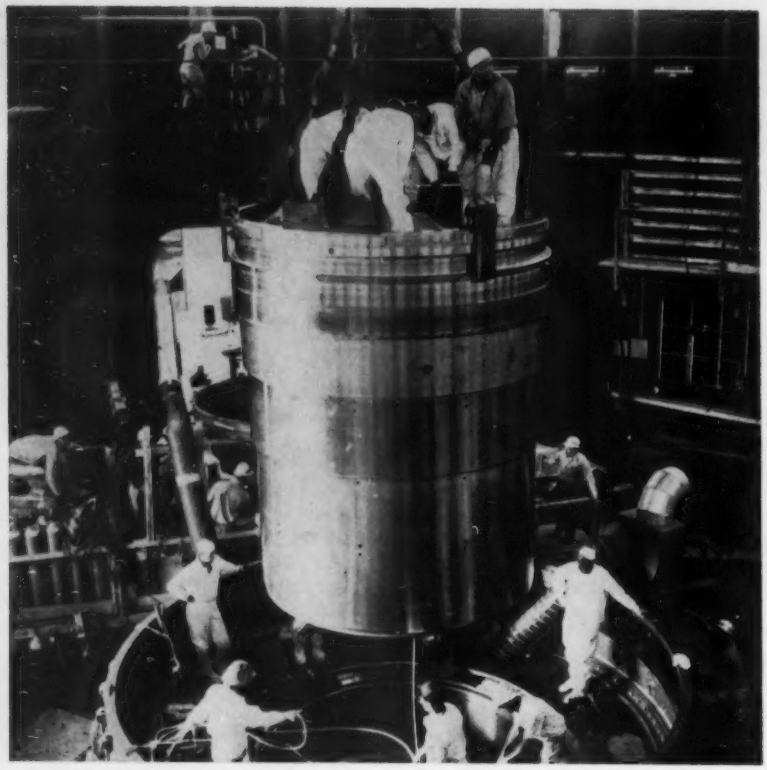


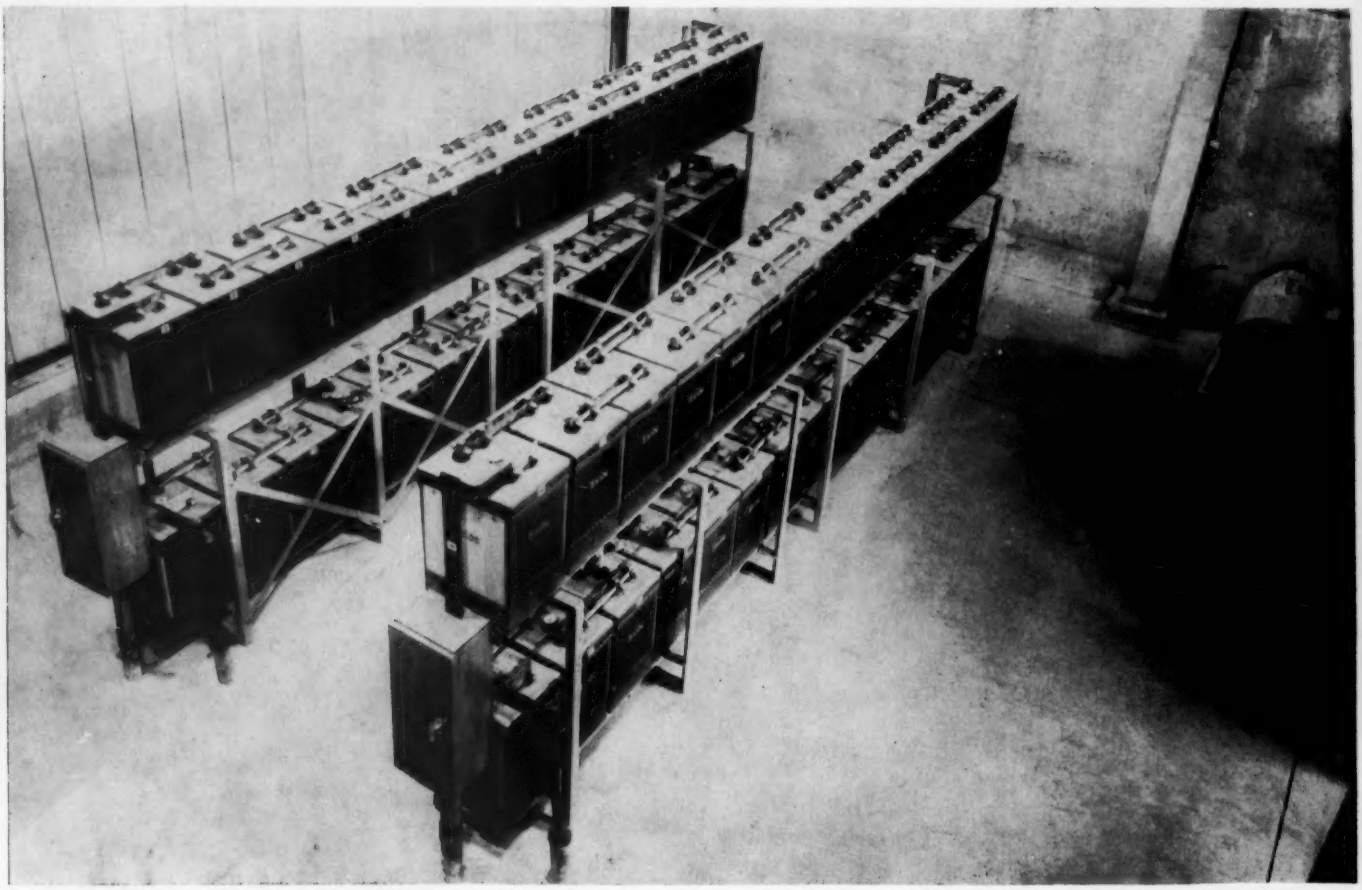
Figure 2

PHOTO NEWS



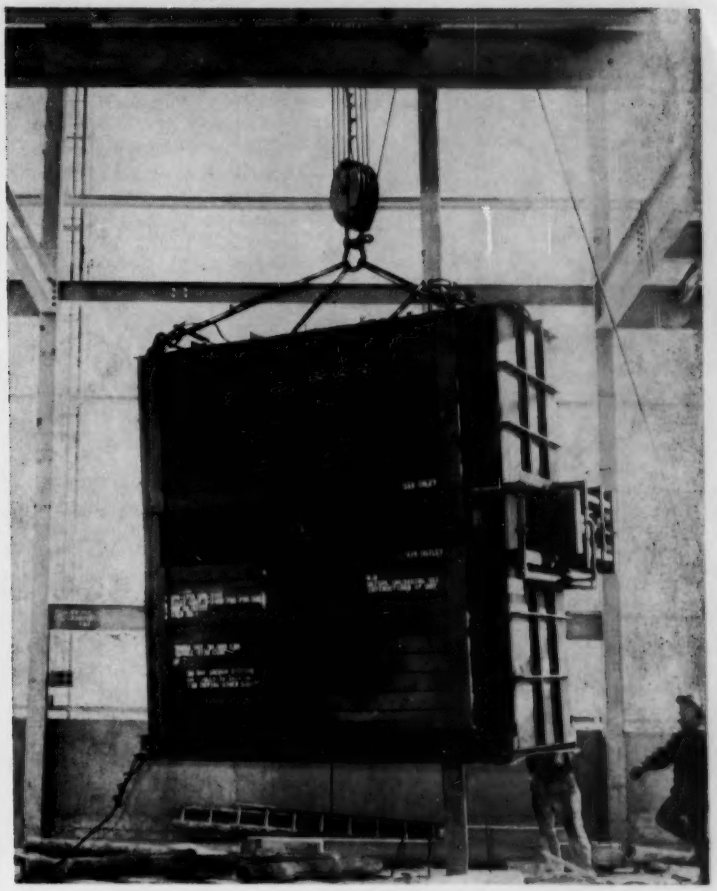
DON'T PULL THE PLUG! This 106-ton rotating-shield plug will act as the closure for the reactor vessel in the Enrico Fermi Atomic Power Plant, Lagoona Beach, Michigan. The plug is heavier than the reactor vessel whose shell weighs 91 tons, and is shown here being lowered into place in a Combustion Engineering plant.

POWER DAM POWER. Vital power for control and emergencies at the St. Lawrence Seaway power dam station is provided by 60-cell batteries. Shown here are one of the three Exide batteries and diverter-pole charger (right). Battery has a capacity of 996 ampere-hours at the 8-hour rate of discharge.

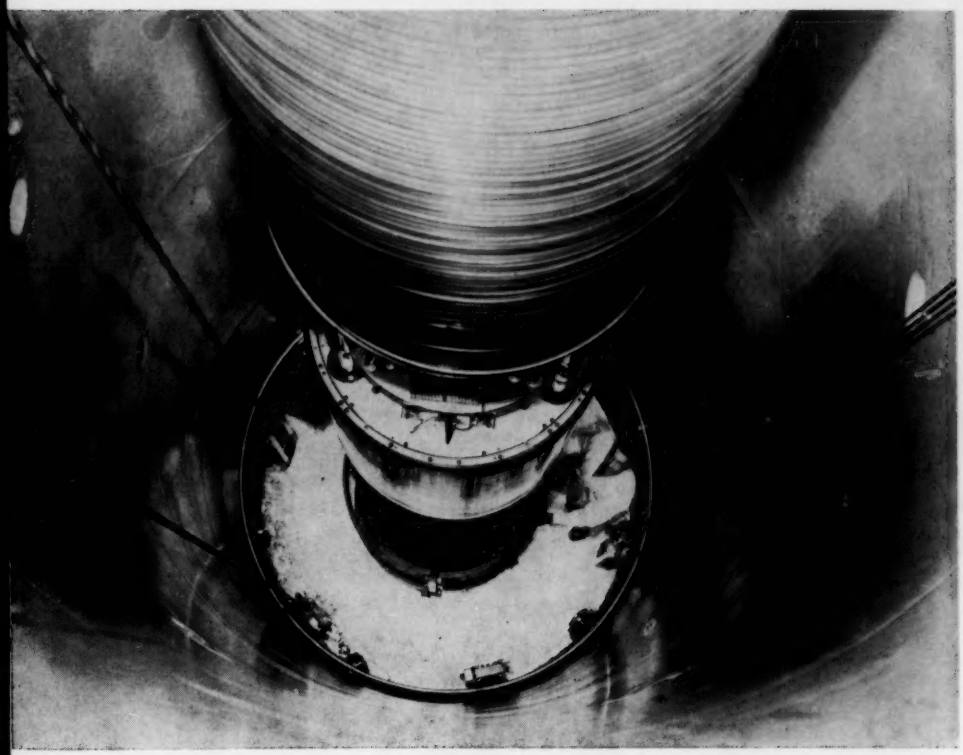


NEW LITERATURE

MOST POWERFUL THERMOELECTRIC GENERATOR YET. At least ten times larger in electrical output than any similar device ever constructed in the U.S., this 100-watt generator was developed for the Air Force by Westinghouse.



GREATEST CAPACITY PACKAGE PREHEATER will be used on a 130,000 lb-per-hr Riley Stoker pressurized oil-fired boiler in power station being built by the town of Braintree, Mass. The packaged unit, manufactured by The Air Preheater Corp., measures approximately 12 ft in diameter.



YOU'RE LOOKING INTO THE MUZZLE of a low-energy, 12-megavolt Tandem Van de Graaf Accelerator at Britain's Atomic Weapons Research Establishment. The accelerator is the largest of its kind in the world.

Compact actuator switch for close quarters

Four oil-tight side-plunger actuator switches are announced in two-page data sheet.

The actuators — a side roller plunger and a plain side plunger — are available in four models which provide compact switches that can "lie down" in close quarters under cams and slides.

Switches have electrical capacity of 10 amps, 120, 240 and 480 volts AC.

(Data Sheet 161 is issued by Micro Switch, a Division of Minneapolis-Honeywell Regulator Company, Dept. P&PSE, Freeport, Ill.)
Circle 9509 inside back cover.

Shutoff valve for safety

Originally designed for service station use, safety shutoff valve finds wide industrial application with hazardous liquid lines of all types. Valve shuts off automatically if a break in the pipe line occurs, thereby preventing loss of product and hazardous conditions.

Four-page bulletin illustrates the valve, describes features, applications, engineering data, and gives other storage tank accessories.

(Bulletin F-47 is issued by OPW-Jordan, Dept. P&PSE, 6013 Wiehe Rd., Cincinnati 13, Ohio.)
Circle 9510 inside back cover.

Design, reference data on O-rings

Booklet gives design and reference on O-rings. The physical and mechanical considerations along with installation, lubrication, and maintenance of the O-rings are included.

A full line of the devices such as: government MIL-specs; aeronautical AMS specs; and ASTM-SAE; as well as a selection of seals meeting the requirements posed by standard industrial compounds under varying temperature conditions are described.

(Auburn O-Rings booklet is issued by Auburn Company, Dept. P&PSE, Middletown, Connecticut.)
Circle 9511 inside back cover.

Transfers from hand to automatic control

Adjustments for remote manual trimming of pneumatic control systems, and for transferring from automatic to manual operation can be provided by selector station shown in four-page specification sheet.

Detailed descriptions of 32 standard types, classified according to application, is included.

(Product Specification P99-1 is available from Bailey Meter Company, Dept. P&PSE, 1050 Ivanhoe Road, Cleveland 10, Ohio.)
Circle 9512 inside back cover.

Dust control info

Data and information on dust control shows how one or a combination of eight cyclone separators can protect machinery investment, product quality, employee health and reduce maintenance costs.

Each model can be installed so that it does not consume valuable floor space.

The literature also includes multiple rating tables, complete specifications and a dimensional drawing.

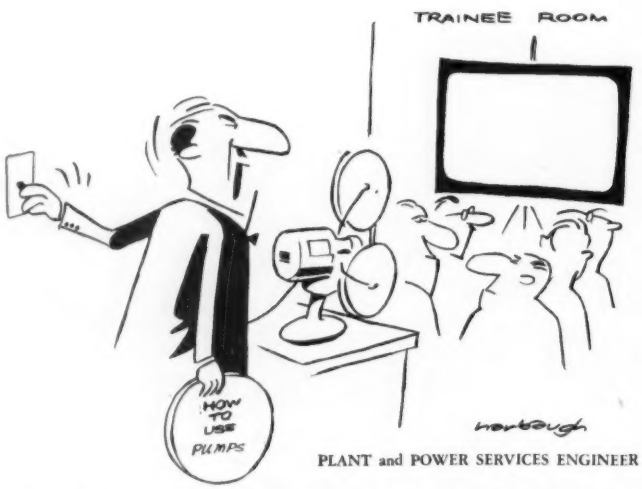
(Cyclone separator literature is issued by Dept. KP-1, Torit Manufacturing Company, Dept. P&PSE, Walnut and Exchange Sts., St. Paul, Minnesota.)
Circle 9513 inside back cover.

Fire fighting equipment — all kinds shown

All types of portable fire extinguishers, wheeled units, built-in carbon dioxide extinguishing systems, and several types of fire detection devices are described and illustrated in 16-page brochure.

Also contained is a chart which shows which extinguishers are approved for use on each class of fire (ordinary combustibles, flammable liquids, and electrical equipment).

(P-49 booklet is issued by Walter Kidde & Company, Inc., Dept. P&PSE, Main St., Belleville 9, N.J.)
Circle 9514 inside back cover.



"All right . . . The lights stay on 'till we find out who's eating popcorn."

Phone, intercom booth for noisy places

A wall-mounting type acoustic chamber to block out surrounding noises for telephones and intercom equipment is described in two-page bulletin.

Since the booth does not have a door, problems caused by sticking doors and broken glass are eliminated. A body-contoured writing shelf is provided.

(Bulletin K9A Hush-A-Booth is issued by the Korfund Co., Inc., Dept. P&PSE, 48-15 32nd Place, Long Island City, New York.)
Circle 9515 inside back cover.

How to use manganese wrought iron

A specialty engineering metal possessing resistance to corrosion and impact at low temperatures is described in 8-page booklet.

Known as "Mn Wrought Iron," the product contains approximately one-percent manganese, and is recommended for piping, tank and pressure vessel applications.

("Byers Mn Wrought Iron" booklet is issued by A. M. Byers Company, Dept. P&PSE, Box 1076, Pittsburgh 30, Pennsylvania.)
Circle 9516 inside back cover.

Bulletin describes arc welding steels

How to join tubing of similar or dissimilar types of steel by welding is discussed in data card.

The card not only summarizes various recommendations for arc welding, but indicates proper type of electrodes to be used.

Steels discussed are carbon steels, chromium-molybdenum alloy and stainless steels.

(Data card TDC-155 is issued by Tubular Products Division, Babcock & Wilcox Co., Dept. P&PSE, 161 E. 42nd St., New York, N. Y.)
Circle 9517 inside back cover.

Outlines accessories for ventilation uses

Comprehensive catalog of sheet metal specialties serves as a guide for a wide variety of applications for industrial ventilation, air conditioning, collection or exhaust systems.

The 12-page catalog gives detailed information on round metal ducts made in any diameter from 3 to 24 inches. Die-formed elbows for 45° and 90° in six sizes from 3 to 8 inches and a line of flexible quick-connectors of 3 to 24 inches using flanged sleeves to form an air-tight fit are included.

(Catalog No. 35-8 is issued by Carrier Corporation, Dept. P&PSE, Syracuse, N. Y.)
Circle 9518 inside back cover.

Ball bearings handle variety of jobs

Providing complete information about the many types and sizes of deep-groove ball bearings, 12-page bulletin contains dimension, load and other application data.

The standard-width bearings are made in extra light, light, medium and heavy series. They may be open, equipped with shields or contact seals, and are offered with or without snap ring.

Deep-groove bearings of cartridge design or with felt seals are also available.

(Bulletin 110 is issued by Hoover Ball and Bearing Company, Dept. P&PSE, 5400 South State Rd., Ann Arbor, Michigan.)
Circle 9519 inside back cover.

Raised floors prove to be versatile

Raised or "floating" floors for computer and data processing rooms are described and illustrated with photographs of actual installations in 8-page bulletin.

Chief features of the floor are said to be: ease with which floor plates can be lifted out; installation of cutouts for cables; use of the floor as a pressurized plenum.

One page of the bulletin is devoted to specifications of a recently introduced model of the raised floor that eliminates the supporting steel frame.

(Bulletin 1001 is available from Floating Floors, Inc., Dept. P&PSE, 22 East 42nd St., New York 17, N.Y.)
Circle 9520 inside back cover.

Smallest gas turbine engine described

Catalog sheet describes the smallest gas turbine engine ever developed and which weighs only 30 lb. The unit is available in 5 and 10 hp models.

The illustrated catalog sheet explains method of operation and tells how the turbine is quick-starting in any temperature and can be used as an auxiliary power unit, a portable pumping system, or as a portable pneumatic system source.

("Turbo-Mite" catalog sheet is available from Curtiss-Wright Corporation, Dept. P&PSE, PO Box 689, Santa Barbara, Calif.)
Circle 9521 inside back cover.

Rotameters handle small fluid flows

Line of rotameters for measuring and controlling fluids flowing at low rates suitable for front-of-panel mounting or for mounting directly in pipelines.

Four-page bulletin tells how the rotameters are applicable to liquids and gases and lists nine flow ranges, all obtained in the same basic body through the use of interchangeable glass metering tubes and glass or stainless steel floats.

(Bulletin 18P is issued by Schutte and Koerting Company, Dept. P&PSE, Cornwells Heights, Bucks County, Pennsylvania.)
Circle 9522 inside back cover.

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NEW LITERATURE

Shows selector switch for compressed air

An easy-operating remote selector switch to direct or stop flow of compressed air to pneumatic motors and valves is described and illustrated in eight-page bulletin.

Two, three and four port arrangements can be made on the same body. Eight standard dial styles and three standard nomenclature plates are available. Capacity is 580 cim.

(Bulletin 357-2 and Form P-79 is issued by The Powers Regulator Company, Dept. P&PSE, 3477 Oakton St., Skokie, Ill.)
Circle 9523 inside back cover.

Condensate treatment for high-press boiler

Treatment of condensate by scavenger mixed-bed demineralizers — important for high pressure subcritical as well as supercritical power plants — is fully discussed in reprint of technical article.

Paper points out the causes and cost of overall heat-rate losses in power plants in the 1800-2400 psig range.

(Publication 117 is available from Cochrane Corporation, Dept. P&PSE, 17th Street below Allegheny Ave., Philadelphia 32, Pa.)
Circle 9524 inside back cover.

Running time meter bulletin available

"Standco" running time meters that register in hours and tenths of hours, hours only, or minutes only are described in 2-page bulletin.

The meters are available in 115 volt, 220 volt and 440 volts either 60 cycles or 50 cycles. They come in 3½" and 2½" flush mounting, panel type of meter, in both bakelite and metal cases, unsealed and hermetically sealed.

(Bulletin 810 is issued by Herman H. Sticht Co., Dept. P&PSE, 27 Park Place, New York 7, New York.)
Circle 9525 inside back cover.

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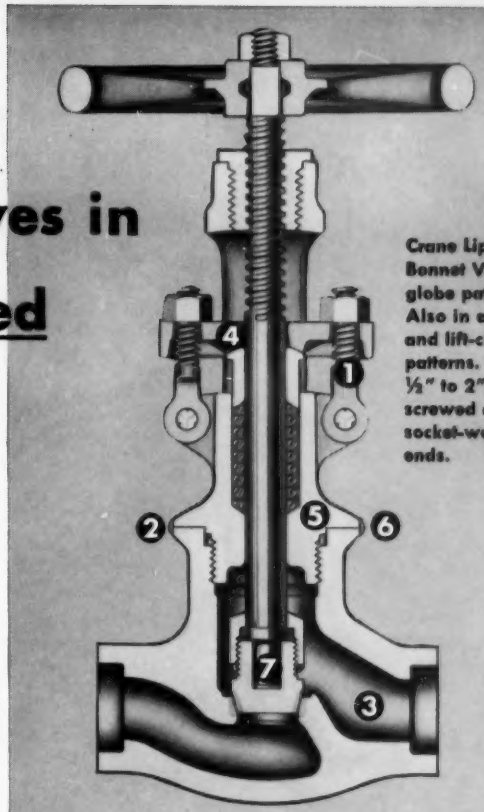

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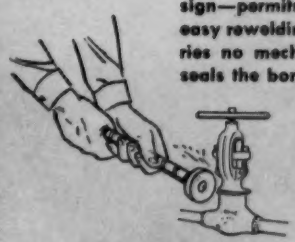

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AIR BINDING . . . Armstrong Traps cannot air bind. Air in the system passes through a vent in the top of the bucket. It collects in the top of the trap and is discharged with the condensate. There is no chance for it to stop the trap. For low pressure on-and-off units where large amounts of air accumulate while the steam is off, Armstrong offers open float and thermostatic air vent traps in a complete range of sizes.

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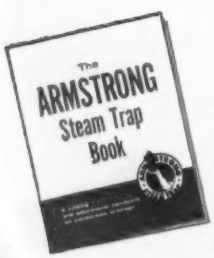

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